

FLIGHT

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AND AIRSHIPS

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Acceleration

IT would be useless to make guesses at the cause which has induced the Government to accelerate the expansion programme of the Royal Air Force, but the decision, whatever the cause, is very welcome. Four squadrons of the Force have been formed this year, and during the next two years twenty-two squadrons for Home Defence and three for the Fleet Air Arm will be raised. We congratulate the Government upon their wisdom in taking this step. It will enable British citizens to sleep somewhat sounder at night, and it will have a stabilising effect upon the distraught nations on the continent of Europe. As the Prince of Wales said, the Royal Air Force, together with the Navy and the Army, makes for confidence, not only throughout the Empire, but throughout the world. Naturally, that confidence would be misplaced if the Royal Air Force were not strong enough to play its due part in a war.

Mr. Churchill did good service in raising the question of Germany's rearmament, particularly in the air. His figures may have been exaggerated, and the Government is usually in the best position to get accurate information, but the whole debate which followed was very useful. It gave Mr. Baldwin the opportunity to state that "His Majesty's Government are determined in no conditions to accept any position of inferiority with regard to what air force may be raised by Germany in the future." It is firm, definite statements of policy like this which prevent nations from entering upon an arms race. Germany has been arming in secret, of course in defiance of her Treaty obligations, and she may have hoped to spring a surprise upon Europe. The *fait accompli* of an air force stronger than that of Britain would have been disconcerting. Something similar was attempted in the case of the German navy before the war, and there are those who hold that that challenge to British naval supremacy

played no small part in throwing this country wholeheartedly into the Entente Cordiale. Germany is slow to learn lessons from experience. She never seems to remember that it was the Goddess of Wisdom, not the God of War, who sprang full-armed from the brain of Zeus.

Mr. Baldwin's declaration has shown Germany that a secret attempt to outstrip British power in the air will be futile. That alone should have a steadying effect, not only upon Germany but upon all the nations whose nerves have been set on edge by the uncertainties of the situation. It will have a reassuring influence on France, and the very natural anxieties of France have been among the dominating factors making for disquiet. Her land frontier is now considered impregnable, but the air cannot be fortified. Paris will feel less cause for fear when there is a British air force always stronger than that of Germany, and able to strike as far afield as the Rhine. These things make for peace.

The Increase

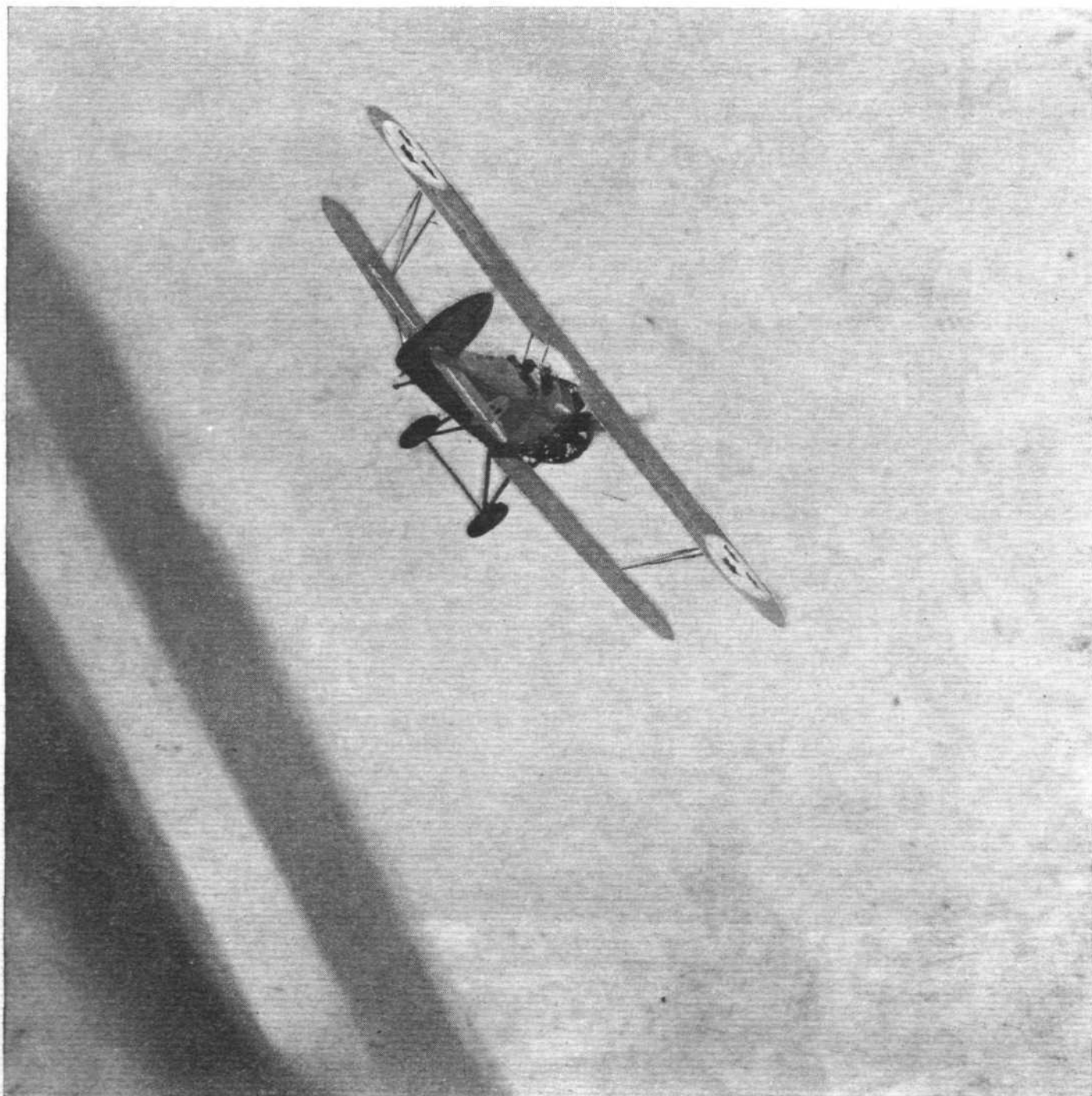
MR. BALDWIN said that an incorrect impression could be gained by counting only first-line strength of aircraft. That is correct in more than one way. What he meant was that a nation which had only first-line aircraft could not replace damaged machines or train new pilots to take the place of casualties. Training machines should always be considered in a class by themselves, for they imply a reserve of pilot strength, not a reserve of machine strength. We should not now use Avro "Tutors" to bomb Zeppelin sheds, as Avro 504's were used in 1914.

In quite another way it is fallacious to count first-line strength when comparing British air strength with German air strength. Mr. Baldwin gave certain figures in his speech. He gave the first-line strength of regular units of the Royal Air Force to-day, at Home and overseas, as 880 aircraft. As a comparison with Germany,

there is not much significance in that figure, for it is hardly conceivable that all the overseas units could be mobilised to meet the Germans. He went on to say that, of these, 560 (including the Fleet Air Arm) are at present stationed in the United Kingdom. He evidently arrived at that figure by including all the aircraft on naval vessels except the *Eagle*. Adding the Auxiliary and Special Reserve squadrons (with an establishment of 127 machines) he gave a total of just under 690 aircraft available to-day in the United Kingdom that could be put into the first line. Again, that figure is not quite so comforting as it sounds. The House was evidently considering the case of an air campaign, bombing and counter-bombing, with the fighters on both sides attacking the bombers. There is no likelihood at all that the whole strength of the Fleet Air Arm could be diverted from its proper work with

the Fleet and thrown into such a campaign, or that the five army co-operation squadrons could be filched from the War Office for the air war. Unless the Cabinet were absolutely convinced that there was no possibility of either Navy or Army becoming engaged, it would be sheer madness to blind those two services by taking away their aircraft. For the air campaign the only strength which we are justified in considering is that of the Home Defence Force.

By the end of 1936, Mr. Baldwin announced, we are to have twenty-two new squadrons for the Home Defence Force, and three more for the Fleet Air Arm. We welcome the news of these three units for the Fleet; they will add considerably to our naval strength. Our air strength as such is to be increased in the next two years by twenty-two squadrons. That is the figure on which we have to fix our attention.



ONE GOOD TURN . . . A "Hart," with the chief photographer of "Flight" as passenger, keeps hard on the tail of a similar machine with "Pegasus" engine, built for Sweden and flown by Flt. Lt. P. W. S. Bulman.

The Outlook

A Running Commentary on Air Topics

The New R.A.F. Squadrons

THE decision to raise twenty-two new squadrons for the Home Defence Force within the next two years has come at a moment when the Air Ministry is busy with problems of re-equipping many of the existing squadrons. Among fighters, the "Bulldog" has done good service for a number of years, but must now be considered obsolescent. The new "Gauntlet" has a very fine performance, which Mr. Baldwin mentioned in his great speech in the House, but it is only regarded as an interim replacement type, and still better machines are on the way. The "Demon," too, has been in service for several years.

An Air Ministry competition is now in progress to decide on a replacement fighter type, and such fine performances are credited to the competing machines that it is possible that, with the selection of the best of them, the present distinction between day-and-night fighters and interceptor fighters may disappear. By day a fighter needs a faster rate of climb, while by night it needs longer air endurance—for night fighters go up on patrol before a raid is signalled.

The Bomber Problem

AMONG day bombers, the "Hart" is still supreme, but it has been in service for a number of years, and aeronautical science does not stand still. Among the night bombers the position is at the moment the worst. There are five such squadrons among the regulars and three among the Cadre squadrons. Two have received or are receiving the "Heyford"; the rest have those faithful but obsolescent types, "Virginia" or "Hinaidi." The "Hendon" has been chosen as a new night-bomber type, but has not yet been allocated to any squadron.

It seems, therefore, that the Air Ministry will speedily have to provide new types for thirteen fighter and six night-bomber squadrons at least, while at the same time raising seven or eight squadrons of fighters and fourteen or fifteen squadrons of bombers, and supplying all of them with modern aircraft. If all this is accomplished by the end of 1936 it will be a great testimony to the Air Ministry's power of rapid expansion.

Composite Aircraft

WERE it not for the fact that the "composite aircraft" scheme described on page 1301 has been conceived by a man so eminently sane and practical as Major R. H. Mayo, one would be apt to condemn it out of hand. When, in addition, Imperial Airways and the Air Ministry take an interest in the invention, it behoves ordinary folk to sit up and take notice. And when one begins to do so, the smile of incredulity gradually fades and gives way to a sense of wonder at the daring of the project. To fasten two aeroplanes together, one on the back of the other, and to take them into the air, launching one from the other when the desired height has been reached, seems at first sight a little short of fantastic. And yet is there not precedence for the idea? For was not, very many years ago, a Sopwith machine, a "Pup" if we remember rightly, launched in this manner from the top wing of a flying boat?

Assuming that the technical difficulties can be overcome—and they may be considerable—what is the advantage of the Mayo scheme? The answer to that question is that it makes possible much greater flying ranges combined with

the carrying of reasonably useful loads. An aircraft with normal wing loading cannot cruise in its most efficient attitude, because this corresponds to a fairly high lift coefficient. If the wing loading can be increased, as it can be when the take-off and landing considerations are eliminated, the speed corresponding to an efficient attitude will go up in proportion. The weight of the fuel saved can then be used for payload, keeping the range the same, or more fuel can be carried and the range increased, keeping the payload the same as before.

Committee's Suggestions

THE Prime Minister last week received a deputation of the Parliamentary Air Committee and listened to a series of suggestions (a full list of which appears on page 1313) put forward by them. The suggestions appear to resemble the ten virgins of the parable, for some of them were wise and some were foolish. For instance (to take the latter class first), the committee recommended that a second Under-secretary of State be appointed to deal exclusively with civil flying, and that the Director of Civil Aviation should be made a member of the Air Council. Neither of these suggestions, if adopted, would be likely to have the result which their well-meaning sponsors intended. The present position is that the Under-secretary of State for Air is responsible for civil flying, and no obvious benefit would result from doubling the post.

As for making the D.C.A. a member of the Air Council, that would hamper rather than help his work. At present he is completely independent of the Service side of the Air Ministry, and the heads of the R.A.F. can no more interfere with him than he can with them. If he became a Member of the Council he would become formally responsible for Service matters, and likewise the rest of the Council would be vested with a formal responsibility for the civil side. No one would be the better for that arrangement. As the D.C.A. already has the right of direct access to the Secretary of State, it is hard to see in what way the interests of civil flying could be cared for much better than they are.

Flying Operations

THE Parliamentary Air Committee went on to make a number of suggestions for improving the operational side of civil flying. Most of these suggestions are quite excellent, and, in particular, we hold that it would only be right to remove the tax from petrol used for civil flying. Aeroplanes have nothing to do with the Road Fund.

It is pleasant to reflect that, of the other recommendations, something has already been done about quite a number of them. Imperial Airways are to speed up their schedules, and they are increasing the frequency of some services. The Atlantic problem is being actively investigated. Internal air services, it now seems probable, will be developed by contracts with the Post Office, which is the healthiest line of development.

We should certainly like to see air survey encouraged and weather reports made as useful as possible. As for the suggestion that "no new obligation to Imperial Airways should be undertaken by the Government which would preclude its financial encouragement of other British aircraft-operating companies," we should not care to endorse that unless some specific case were presented which would be certain to give better results.



*Experiences During a Journey to Baghdad in a Privately Owned Machine :
Part I.—From England to Italy*

By C. N. COLSON.

FLIGHTS to places like Kenya, Baghdad and even farther afield are now comparatively common occurrences among habitual users of aeroplanes. We have pilots like Campbell Black, who has been out to Kenya no fewer than fourteen times, and, indeed, many others who think nothing at all of leaving at short notice for the Far East or South; but the ordinary flying-club member has little idea of what such a journey really entails; therefore, having been to Baghdad and back quite recently, I am in a position to give some details which will, I hope, make the problems of such a journey easier to understand. I shall not attempt to become lyrical about the beauties of the scenery, but simply content myself with saying that they are enhanced many times when viewed from the air. I suggest that nobody has ever really seen Vesuvius, Rome, Monte Carlo or the Alps until they have flown over them; nor can they have realised the limitless, burning terror of the desert until, after several hours of "nothingness," viewed in comfort from the cool cabin of an aircraft at 8,000 feet, they see a plodding camel train below them apparently coming from nowhere and going to nowhere.

We—that is, Mr. Graham Mackinnon, the owner of the D.H. "Dragon" G—ACOR, Mr. F. Farey Jones, Mr. K. W. Bear, Mr. J. K. Morton (our pilot), Mr. M. O. Gatrell (the engineer), and myself—assembled soon after 8 a.m. on October 8 outside Rollason's hangar at Croydon, where OR is housed and serviced. As usual at Croydon it was murky, cold and very uninviting, but we had a schedule by which to set our pace, because we had to get to Baghdad before the competitors in the England-Australia Air Race went through there.

After weighing-up our personal baggage, hearing sundry dubious-sounding noises from Morton while it was being stowed in the machine, and, finally, indulging in the usual round of hand-shaking, we left our friends to console themselves with their come-back-safe-dear looks on their faces, and took off. Morton rather expected trouble because the weather report he had obtained before we

left showed that an "area of low pressure" was at that time leaving England and travelling slowly across Europe in a south-easterly direction—it would be! Imperial Airways make light of that sort of thing. Their wonderful knowledge of the route, backed by admirable wireless control from Croydon and Le Bourget, allows them to fly through thick weather with impunity and safety; but we more ordinary flying people cannot do that sort of thing—we have to play for safety. So on this occasion, not only because we didn't particularly want to break our necks, but also because we were on a job of work and had to get to our destination, we were prepared to sit down when we found the weather too thick.

It didn't get really bad until after we had left the English coast, which we reached via Crockham Hill, in Kent, where Mackinnon lives. We struck out across the Channel somewhere

about Dungeness. The farther we got the thicker it became, and finally we had to fly "blind" quite a lot. It was evident that it wasn't good enough to carry straight on to Paris, so we went down over the sand dunes to Berck, the aerodrome for Le Touquet, reporting to Croydon by wireless telephony that we were doing so.

Berck aerodrome is a good place at which to enter France. Customs can be cleared far more easily and quickly than at Le Bourget, and many people are making a habit of going that way. "Charlie," who has been in charge ever since the aerodrome opened in 1922, is a helpful soul, thus displaying qualities frequently lacking at aerodromes abroad, and very wise with the weather lore of the district.

The aerodrome is not huge, but the longest dimension, at any rate, was ample for our heavily loaded "Dragon"; even the short way across proved sufficient when we took off the next morning—but that is anticipation. The surface is quite good, level and sandy, so presumably it dries fairly quickly after heavy rain. On most French aerodromes the Government organisation, the Société de Navigation Aérienne, provides a hangar and certain other

This is the first instalment of an article by Lieut.-Com. Colson, R.N., describing the recent journey which he made on behalf of "Flight" to investigate the conditions that the ordinary pilot is likely to encounter on a journey of this description.



(Above) Mr. A. Scriabine (left) and Col. A. Vetta (right), aviation insurance underwriters in Italy, talking to Mr. Graham Mackinnon, of Lloyd's, at Ostia, the seaplane port of Rome. (Right) Clouds—an impression from the "Dragon's" cabin windows.



essential services, such as having someone to obtain weather reports, and, therefore, the charges are fixed. The landing fee is six centimes per horsepower, as entered in the log-book, so we had to pay 14.40 francs. We thought for a while that the thick mist which came almost down to the ground would lift, but after we had eaten a belated breakfast of coffee and *œuf-sur-la-plat* at the little restaurant by the road bordering the side of the aerodrome, it looked even more set in for the day, and Charlie was quite certain that we would not be able to get away. So, after much discussion, we decided to go into Berck for lunch, nourishing the faint hope that we might be able to get away later on.

We took one of the local buses which pass the aerodrome every half-hour or so, and about a quarter of an hour later descended on the Hotel de la Terrasse et Terminus with our six persons and ten bags. Monsieur le Patron rose to the occasion and, though it was getting late for lunch, soon had a most delectable meal ready. The aptitude of the French hotel proprietor for producing meals at any hour of the night or day ought, by science, to be distilled as a serum, and the proprietors of our country hotels should be inoculated with it by law. It was out of the season in Berck, but the Terrasse did us well and cheaply, and is to be recommended as one of the better parking places for weather-bound pilots.

After lunch we finally gave up hope of getting away, as it was pouring in torrents and that, with the natural dullness of the short autumn afternoon, made things look pretty glum. I think our spirits sank lower at Berck than anywhere. We had set our schedule as Marseilles or Cannes for our first night, but here we were, at the very outset, losing time; moreover, we were told that there was nothing open in Berck—no cinema, not even a public library! However, the Terrasse had two billiard tables, a French and a Russian, and they got good use that night.

Here we also inaugurated what was later to become our regular practice—the dawn start! The hotel again showed their mettle; we all got called in time with coffee and rolls,

the taxi was ready—though how that Renault got all six of us and the bags on board is still a mystery—and we were out at the aerodrome by 5.30 a.m.

Charlie took the statutory six francs off us for housing OR and another 16.50 francs for customs clearance. He also obtained a weather report for us, and sent us on our way hopeful of making up for the lost time of the day before. The trip to Paris (Le Bourget) took just one hour and was rather beautiful as we flew at about 4,000 feet over waves of pink-tinged mist, which got redder as the rising sun caught them. On the way we heard Mr. Pugh, of Commercial Air Hire, Ltd., talking to Croydon as he made his way through thick murk in England. Mr. Pugh and his fellow-pilot, Mr. Hattersley, fly over to Paris every morning with daily papers. They leave before dawn, and more often than not have to fly by instruments almost the whole way.

We did everything we could to get away from Le Bourget quickly, but one hour had gone before we were in the air again. It is impossible to hurry the officials there, and the man who tries will probably only succeed in being delayed even more. However, we paid our 14.40 francs landing fee, learnt that the depression of the day before had not gone so far as we hoped, and took off to face the worst.

We got it. "Archibald," as we nicknamed this cold-front which was delaying us so much, still stretched



The pilot, Mr. J. K. Morton, looking back in the cabin towards Mr. Graham Mackinnon.

from north-west to south-east, right across Europe. He was moving, and moving quite fast—for a depression—but our speed was faster, so we kept catching him up. Between Paris and the Rhône Valley, down which we wanted to go, are mountains, lots of them, and they caught hold of "Archibald" so that he covered them in a mass of wet cotton-wool through which we could not fly. We tried by various routes to get across either to Dijon or Lyons, but had to turn back, and eventually we landed at Auxerre.

This turned out to be a most admirable port of call for such an occasion. The owner of the nearest garage, who was passing, took some of us into the town and refused to take any payment or even a tip because he was not called out especially to us! He calls his business the Garage de L'Aéroport, and I hope he gets the success he deserves. Auxerre again showed evidence of the help



(Above) Le Bourget from the air; an Imperial Airways H.P.42 can be seen on the tarmac.

(Right) The palatial booking hall in the Airport building at Lyons. The mural air-route map is carried out in figured-wood veneers.

which touring aviators get from the French Government. There is a large hangar and telephone for weather reports, which in this case could be obtained from the radio station erected for the dissemination of these reports and situated only a short distance from the aerodrome.

The president of the local Aero Club came out to see if there was anything he could do for us, and, on seeing our carnet, the caretaker readily supplied us with Shell petrol without our having to pay cash. The Shell carnet system has to be seen to be believed. Almost everywhere you go there are facilities for the holders of these carnets. You just present the carnet and the company's officials, figuratively speaking, present arms. They jump to do your bidding, and if you play fair there is little that cannot be done in the matter of getting help, whatever form it may take, when you are flying under their care.

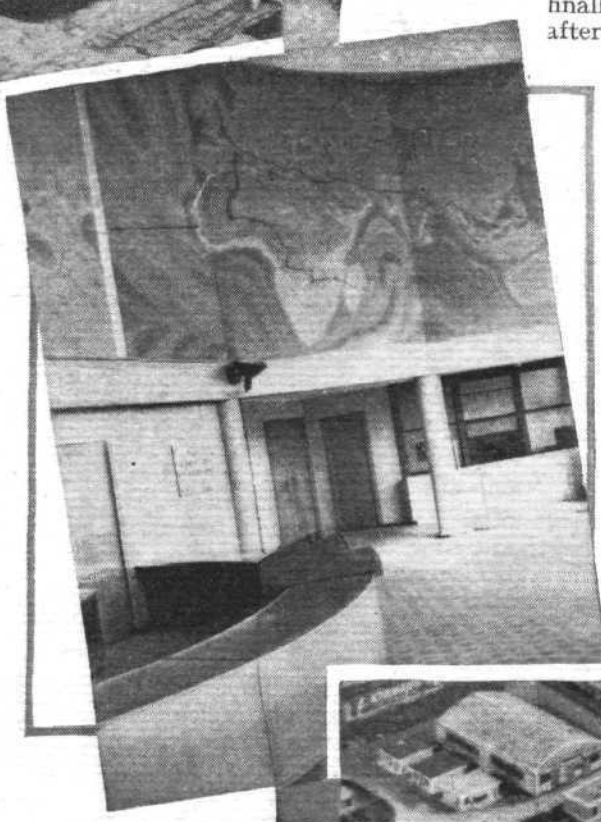
We went into the Hotel de Bourgogne for a meal, but it was not very good. We managed to get some of the food the flies left us but, on the whole, were not sorry when everyone had finished and we were ready to go back to the aerodrome. There we found that one of the wireless officials who spoke English had come out from the station to help us. He explained the local weather and showed us, with the help of the president of the Aero Club and his maps, the best routes in the present rather bad circumstances.

As we had waited over an hour and a half we thought there was a good chance of "Archibald" having moved over the mountains. He hadn't, and, after poking into several valleys south of Nevers, we were forced to turn back and land at Paray le Monial, quite convinced that flying through the southern parts of France in October was a mug's game. Morton certainly thought it wasn't good enough, because he had once been caught in a valley farther south when the clouds were right down on the top of the hills and he had to fly underneath a high-tension cable to get out again! The French have a nasty habit of spanning their large valleys with cables, and often they are not marked on the map.

Paray aerodrome is on the top of a hill, so from it we could get a good view of the distant mountains, which we could see were covered with low cloud. The aerodrome is amply long for the "Dragon" in the direction of the prevailing wind, though the take-off is slightly uphill. Across the shorter way in which we had to take off later it is not really quite long enough for a heavily loaded "Dragon," and it was here that we first instituted our "take-off by numbers" procedure, which amused many people at subsequent aerodromes. Morton would taxi to the extreme end of the aerodrome, then, at the command "One!" we all got well forward so that he could get the tail up easily; when he shouted "Two!" we eased back in the cabin so that he could get the tail down; and, finally, we slipped into our seats quietly after he was climbing steadily. We

weren't really overloaded, but it made things easier for Morton, especially later on when we got to where it was really hot and the air rather thin.

Paray is run by a family. Father stands round in clogs and directs; the son dons overalls and generally lends a hand; the daughter runs the office, collects the 14.40 francs for landing and the 6 francs for housing, as well as keeping the books, signing the log book, getting weather reports, and so on; and, finally, mother keeps the fires going and asks you into her sitting room when you want somewhere warm, where you can spread your maps out and discuss the various routes



The magnificent airport building at Lyons seen from the air.

through the mountains. One snag about Paray is that there is no Shell service, so we had to get Stanavo and pay for it on the spot.

Later that afternoon we had another shot at getting further on our journey, but we couldn't get through to Mâcon, where there is a small aerodrome, although we hoped that if we got as far as that we could get further down the Rhône valley to Lyons for the night. We tried going down the Loire valley, hoping to get over by St. Etienne, but couldn't get much further than Roanne. There is an aerodrome there, and we had a good look for it but missed it—luckily, as it turned out, because when we got back to Paray again two French officers flying to Lyons to join the fleet of French prototypes which were then assembling for a mass flight to Morocco told us that

Roanne aerodrome was very soft and bumpy as well as small. Back at Paray we bargained with the *patron* of the Hotel Terminus, who had come up with a well-worn Citroën car to "get" us. He weighed about twenty-four stone, but we all got in somehow, although his son had to come with another ramshackle vehicle and take the luggage. That hotel wasn't too bad, although I believe a few voracious *petits animeaux* found the taste of English blood much to their liking. Anyhow, we were in the Beaujolais country, and the French Air Force officers knew how to keep a party going!

Six-fifteen a.m. the next morning saw us out on the aerodrome watching the sun rise with hard fiery brilliance over the tops of the distant mountains. By 6.45 we had pushed the "Dragon" out; I had packed our luggage into the after end of the cabin—instead of in the luggage locker nearer the tail—to keep the weight as far forward as possible, and soon we were heading into that sun with relieved feelings when we saw that we could get between the cloud base and the tops of the mountains with ease. We went direct over Charolles to Mâcon so as to get over the mountains as quickly as possible; then, once we got into the Rhône valley, our luck changed, and, with a hefty Mistral wind blowing us southwards, we covered the 250-odd miles from Paray to Marseilles in two hours, including a circuit of Lyons, to let them know that we were not landing as Paray had advised them we might do. We fairly rocketed down past Montelimar and Avignon, making Bear, who had started on this trip without ever having flown before, wish he had never been born. The Mistral, blowing off the mountains as it does, is about one of the bumpiest winds you can find.

The Mediterranean

At Marseille we were in great hopes of making up some of our wasted time and catching up our schedule again, but, despite the help of the Customs, who cleared us as quickly as they could, it was some three hours later before we finally got away. This was the first and only place where our refuelling arrangements let us down. Apparently the staff is unable to refuel a flying boat up in the Etang de Berre without taking all their men away from the aerodrome, so we just had to sit in the unattractive fly-blown café over our coffee and omelettes until they had finished. When they came they didn't even run to a proper pump, but had to roll barrels out to us and pump the petrol in by a hand pump stuck in the bungholes.

Marseille is a very good place at which to get weather reports, as the met. officer on the aerodrome has his own organisation there, and is always ready to explain the charts and give pilots forecasts. "Archibald" had by this time passed well to the East, so when we took off we were hopeful of making Pisa without further trouble. The clouds were quite high and let us get over the mountains behind Toulon and strike the coast at Nice. It had turned out quite sunny by then, and that trip was really glorious. It was still a bit bumpy, but the further we went the less the Mistral affected us and the better Bear felt.

At Nice, where we met the Mediterranean, we had to become reconciled to going over water for hours on end. This didn't really worry us very much. Our two Gipsy Major engines showed no signs of wanting the attentions of Gatrell (who, incidentally is on the staff at Rollason's at Croydon, and looks after this machine in the normal course of his work), and, even if one did stop—an exceedingly unlikely occurrence—we knew that we could keep up on one engine, although we might have to drop some of the baggage to give us a reasonably wide margin of safety in that condition. However, it was not until later on that we really got bold and came to think nothing of 300 miles across the water. What we ought to have done was to have gone direct from Marseille or Cannes, over Corsica to Cagliari in Sardinia, and thence to Tunis. That would have saved us nearly two days, but we had our schedule laid out for the route down the Italian coast, besides which the Italian Air Ministry had been warned of our trip, and we

also wanted to see how aviation was run in Italy. After leaving Cannes the coast has to be followed, as inland is a prohibited area. Monte Carlo, San Remo, and the Ligurian Alps looked sparkling and beautiful, and soon restored our spirits, which had been damped so much by the past murky weather. When we got near Savona we began to think about saving time again. The weather was beginning to look rather forbidding, and in the distance we could see thunderstorms with their occasional flashes of lightning flickering down. Morton passed a note back asking me to lay off a course from where we were, direct to Pisa, straight across the Gulf of Genoa, a distance of about a hundred miles. So I got my Simmonds-Goudime Course and Distance Calculator to work, checked up the wind as near as I could with the help of the waves and the weather report we had got at Marseille, and gave it to him, together with an E.T.A. (Estimated Time of Arrival), which would be a help if it got much thicker and we lost sight of the coast altogether. It did get rather thick and we ran into a lot of rain, but Spezia, around which is a prohibited area, stands out from some distance.

Our arrival at Pisa was just a little hectic, as we had to dodge between extremely heavy rain and thunderstorms with exceptionally unpleasant-looking lightning. However, we got in and found the large aerodrome without any difficulty, as the Leaning Tower makes an excellent landmark.

Pisa is a grand place at which to land. Like many Italian aerodromes, it is labelled as a civil airport, but is in effect military, so that there are plenty of men about to help you, and everyone seems interested in you and your welfare. The Customs officials are punctilious but courteous, and, provided you don't make things difficult for them but realise that they have their job to do, you can get through fairly easily and quickly. Here we had our first taste of a petty restriction which is both pointless and annoying; that is having to have the cameras sealed up so that no photographs can be taken from the air. In order to avoid any chance of delay we had declared our cameras by an entry in the log book, and they now had to be produced, bound round with string, and the knot sealed with a lead seal. It is possible to get permission to unseal them after you have landed and take photographs in the towns, but it takes away much of the interest if you can't operate them from the air as you fly.

Pisa's Leaning Tower

The director of the airport did everything he could to help us, even to making special arrangements whereby the "Dragon" would be got out early the next morning ready for us to start soon after dawn. He advised us to go to the Hotel Nettuno, which, though a little noisy, was fairly cheap and very comfortable. After some tea we duly did our duty by going to see the Leaning Tower. We found it far more beautiful than we had imagined, and the duty became a real pleasure. It was dark by the time we reached it, but it was flood-lit with a pale greeny-blue light which brought out the natural beauty of the stone, and, with the cathedral alongside, made a most impressive sight.

Our "dawn" start was rather late from Pisa, because it was here that we first ran up against the solicitous attitude adopted by the Italian authorities. They will not let you start without getting a weather report and making you sign for it before you go, and it was after 7.30 a.m. before we could get that report. In the direction of the prevailing wind Pisa aerodrome is large, and there was no need for us to do our numbered take-off; the new arrival must look out for rather a large number of high-tension cables and wireless masts in the immediate neighbourhood, but, apart from these, the approaches are very good, as the surrounding country is quite flat. It is said that the surface of the aerodrome sometimes becomes a bit soft after very heavy rain, but the director told us that it was being re-drained, so probably that deficiency will shortly disappear.

Rome was our next objective.

(To be continued.)

THE FOUR WINDS

ITEMS OF INTEREST FROM ALL QUARTERS

The Duke of Gloucester

On Wednesday of last week the Duke of Gloucester made his first flight in Australia, when he was taken for an air tour of the north of New South Wales in the *Faith in Australia*—previously used by Mr. C. T. P. Ulm.

"Comet" for Atlantic Flight

Senhor Carlos Bleck and Lt. Costa Macedo have purchased the D.H. "Comet" on which the Mollisons flew non-stop to Baghdad. It is stated that new engines will be fitted, and, when the machine is ready, an attempt will be made to fly from Lisbon to Rio de Janeiro in forty-eight hours.

Twenty-five Years Ago

From "Flight" of December 4, 1909.

M. Santos Dumont has recently fitted a 40 h.p. engine to his "Demoiselle" and had a somewhat exciting experience while testing it at Issy. . . . The little flyer developed an extraordinary speed and rose rather over easily. The unusual pace caused M. Dumont to immediately descend. He, however, was unable to bring the machine to a standstill, although he used his hands as brakes on the wheels, before it collided with the railings. M. Dumont was uninjured, but the wings and screw, being somewhat damaged, have been sent to St. Cyr for repair.



RECORDS! Capt. Neville Stack has entertained scores of gatherings of flying folk by his songs; now, as related on page 1304, his friends have induced him to have some records made.

Faireys in the North

Covering about 22½ acres, the works until recently occupied by the Willys Overland Crossley car company, at Heaton Chapel, near Stockport, have been bought by the Fairey Aviation Co.

New Russian Airship

Russia's new semi-rigid airship, the USSR-B-6, has been completed. Several original features have been introduced in its construction by the designer, M. Kulik, such as a welded metal keel, and welded duralumin gondola. When trials are completed this airship will be employed on the Moscow-Sverdlovsk route.

Pacific Flight Starts

Mr. C. T. P. Ulm, with Mr. G. M. Littlejohn and Mr. J. L. Skilling, left Oakland, California, on Monday in the Airspeed "Envoy" en route for Australia via the Pacific.

Uncertificated

Following a flight last week from Australia to New Zealand, two airmen, Ray Whitehead and Rex Nicholl, have been charged with using an old uncertificated aeroplane!

By Autogiro to the Cape

The Hon. Mrs. Victor Bruce who, as reported last week, was attempting a flight from England to the Cape in an Autogiro, has met with early misfortune. She was forced down at Nîmes in the teeth of a 50 m.p.h. gale on Tuesday of last week, and after the machine had landed it was blown over, and damaged to such an extent that Mrs. Bruce has had to postpone her venture until repairs have been carried out in England. Mrs. Bruce, it is pleasing to know, was unhurt.

Mlle. Boucher Killed

Mlle. Helene Boucher, one of France's best-known women pilots, and holder of several records, was killed near Versailles on November 30, when her aeroplane crashed into some trees. That evening Gen. Denain, the Air Minister, visited the hospital where she lay and pinned on her breast the Cross of the Legion of Honour. On Sunday her body was taken to the Invalides, where it lay in state—the first time in the history of the Invalides that the lying in state of a woman has been permitted.



RECEPTION: When the K.L.M. "Douglas" returned to Schipol aerodrome, Amsterdam, after the Melbourne Race, 80,000 people were present to see the famous machine and its crew. The line of mounted police in the background adds a picturesque touch.

R.A.F. EXPANSION PROGRAMME

Mr. Baldwin's Statement : Twenty-five New Squadrons : Sites for Eleven New Aerodromes Selected

AN important debate took place in the House of Commons on November 28th, when Mr. Churchill raised the matter of Germany's re-arming, particularly in the air. He said that several days of intensive bombing of London and other cities must do great damage; but if two Powers showed themselves equally capable of inflicting damage upon each other, so that neither would gain an advantage and both would suffer most hideous injuries, it seemed probable that neither would employ that means.

Mr. Churchill asserted that Germany had at this moment a military air force with the necessary ground services and reserves and material that was rapidly approaching equality with our own. He predicted that by next year, if Germany and ourselves executed the existing programmes, the German air force would be at least as strong as our own; that on the same basis by the end of 1936 it would be nearly fifty per cent. stronger; and that in 1937 it would be nearly double our strength. Germany had between 200 and 300 machines with a speed of 220 to 230 m.p.h. which were now carrying mails and, to some extent, passengers, and they could be converted into long-distance bombers of the highest efficiency in a few hours. By this time next year the number would be at least 400.

Mr. Baldwin's Reply

Mr. Baldwin made an important speech in reply. He said that he could not give figures of German aircraft with any accuracy, but he thought that most of the accounts given in this country and in the Press had been much exaggerated. The figures which the Government had on excellent authority ranged from 600 military aircraft to 1,000. The French Government (whose tendency would not be to minimise figures) put the German strength at 1,100 military aircraft.

The total number of Service aircraft which a country possessed was quite different from the first-line strength. One could get a wholly erroneous picture by mentioning only first-line strength.

The first-line strength of the regular units of the Royal Air Force to-day at home and overseas was 880 aircraft. Of these, including the Fleet Air Arm, 560 were on the Home stations in the United Kingdom. There were at Home the Auxiliary Air Force and Special Reserve Squadrons, with an establishment of 127 aircraft, making a total of just under 690 aircraft available to-day in Europe which could be put into the first line. Behind this there was a far larger number either held in reserve to replace peace-time wastage or in training or for experimental purposes.

"Therefore," declared Mr. Baldwin, "I say there is no ground at this moment for undue alarm, and still less for panic. There is no immediate menace confronting us or anyone in Europe at this moment—no actual emergency—but we must look ahead, and there is ground for very grave anxiety, and that is why we have been watching the situation for months past, and shall continue to do so."

Proposed Acceleration

Mr. Baldwin then announced an acceleration of the programme which he had given to the House on July 19th last. It was proposed to form in 1935 and 1936 twenty-two squadrons for Home defence and three squadrons for the Fleet Air Arm, which was an integral part of the R.A.F. These were additional to the four already forming in the current year, and this meant that our first-line strength by 1936 would be increased by some 300 aircraft over this present figure, and would carry behind it the large number considered necessary for reserve, etc.

Mr. Baldwin further stated that since July, over ninety sites for aerodromes in nineteen counties had been inspected and sites for eleven new stations had been finally selected; plans for altering forty existing stations were also well advanced. Orders would be placed next year for between 80 and 90 per cent. more aircraft than in the present year, and there would be a large increase in the number of engines ordered.

As to the provision of personnel, an additional training school had been opened and another would be opened next April. The number of short-service officers had been increased, and there would be an increase of about 100 per cent. in the entry of aircraft apprentices next January.

"Germany," said Mr. Baldwin, "can produce rapidly, if she chooses, aircraft and men, but a country which has for years possessed no military air force starts under a very heavy handicap, and it must necessarily be some time before, from the military point of view, such a force can equal in efficiency a force which has had behind it ever since the war the whole technique under which men have been trained."

It had been stated, said Mr. Baldwin, that foreign civil aircraft could pass our fastest modern military fighters and leave them standing. If we took one or two of the latest types of modern civil aircraft of outstanding performance and compared them with the slowest of our fighters, already in course of replacement, it was to a certain extent true—but was a truth which was exaggerated. If those civil aircraft had to be equipped for military service, there would be a very big falling-off in performance.

"If," said Mr. Baldwin, "you take our latest type now in production and passing actually into the squadrons, as the House was informed the other day, these have a speed of over 230 miles an hour. Other types now flying but in the development stage have a yet higher performance, while newer types, again, the design of which is well advanced, will show a remarkable further advance in speed and general performance. Our latest single-seater fighter now coming into service compares more than favourably with any in the world."

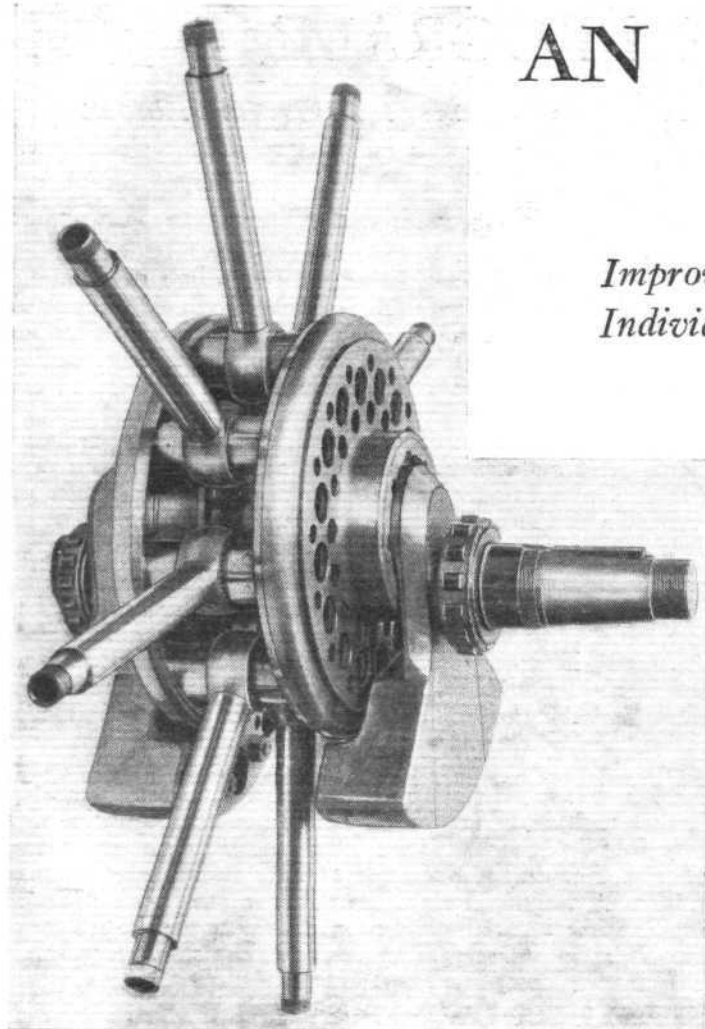
Comparative Strength

Referring to the comparative strength of British and German air forces, Mr. Baldwin said it was not the case that Germany was rapidly approaching equality with us—the German figures were total, and not first-line, figures. Her real strength was not 50 per cent. of our strength in Europe to-day; and as for the position next year, he estimated that we should still have in Europe alone a margin of nearly 50 per cent. The Government, he said, was determined in no conditions to accept any position of inferiority with regard to what air force might be raised in Germany in the future.

In connection with civil aviation and its application to war use, Mr. Baldwin gave as an example some French figures. With the subsidies for civil aviation for the current year, about £1,250,000, French air lines maintained in commission about 185 heterogeneous types of aircraft, many capable of being used in war, but less efficient than aircraft specially designed for the purpose. For that expenditure we could maintain ten regular and five Auxiliary squadrons, with a first-line strength of 180, equipped with military aircraft and trained personnel, with a proper reserve behind them, to say nothing of the background of service organisation. He thought, therefore, that the threat of what might come from civil aviation was exaggerated, because civil aviation as it existed to-day was of subsidiary importance in war so long as there were efficient military air forces in existence to cope with it.

AN UNORTHODOX TWO-STROKE

*Improved Version of the Newman "Meteor" :
Individual Charging by Each Piston : Possi-
bilities of Direct Fuel Injection*



The crankshaft and connecting-rod assembly.

THE first description of the "Meteor" two-stroke engine was published in *Flight*, of September 2, 1932. Since then a second engine, known as the "Meteor" II, has been designed and built, and a certain number of test runs were made early this year in the engine test-house at Heston.

Fundamentally, the "Meteor" II engine is a multi-cylinder air-cooled radial, in which the equivalent of crank case compression has been obtained by closing the bottom of each cylinder and using a rigid, non-articulated connecting-rod passing through a bush or stuffing-box in the closed lower end of the cylinder. Converting the reciprocating motion of the connecting-rod into a rotary motion of the crankshaft has been done by a species of "inclined plane," formed by an inner and an outer ring on the crankpin. The thrust of the lower end of the connecting-rod on the face of the inner ring causes a side load on this ring and turns the crankshaft. The purpose of the outer ring is, of course, to hold the connecting-rod big-ends in contact with the face of the inner ring.

The objections which may be raised against the arrangement are fairly obvious. The

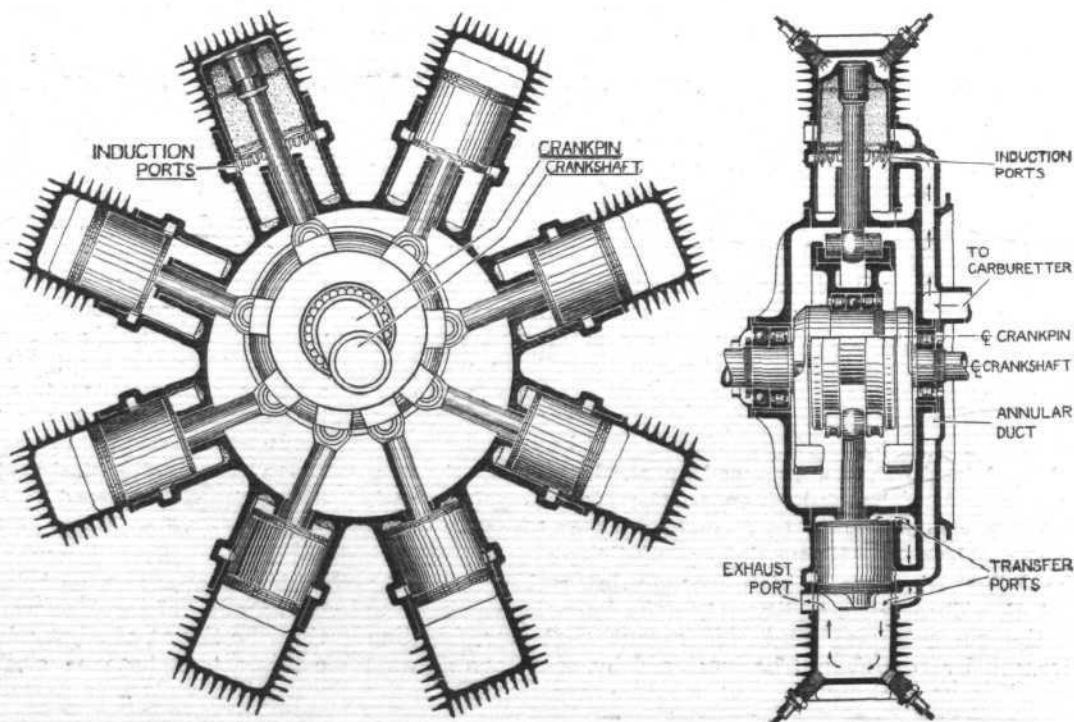
fact that there is a side load on the overhanging portion of the connecting-rod must of necessity mean that there is also a certain bending stress on the rod, and a side load on the bush of stuffing box, which must cause a certain amount of wear. It was, however, found in the first engine, which ran for a good many hours, that this wear was not heavy enough to cause serious leakage through the stuffing box.

Another criticism which might be raised is that the two rings on the crankpin are fairly heavy. Since, however, these rings are the means whereby simple crank-case compression is obtained, and do away with the need for any complications in the form of blowers, valve gear, etc., their weight is probably justified.

Distribution Difficulties

We believe that during the earlier running tests a good deal of trouble was experienced in connection with the distribution. This might have been expected, and is probably really a more serious drawback than either the uneven wear of the stuffing boxes and the extra weight of the crankpin rings. One obvious way of overcoming the distribution difficulty would seem to be to go over to direct fuel injection. That would also have the advantage that air only was compressed, and would probably result in a considerable improvement in fuel consumption. Mr. W. J. Newman, the designer of the engine, is understood already to have considered this conversion. Of course, the fact that the pumps would have to operate at engine speed might present difficulties, and it might be necessary to duplicate the pumps.

The "Meteor" engine is being handled by Remtor, Ltd., 26, Bush Lane, London, E.C.4.



These drawings show the general arrangement of the "Meteor" II.

COMPOSITE AIRCRAFT

A "Double" Seaplane being built by Short Brothers : Lower Machine to carry Upper One to its Operational Height, then Release it

A WELL-KEPT secret having leaked out, it has become permissible to refer to some extremely interesting experiments which are to be made when two new aircraft types, now being constructed at the Rochester Works of Short Brothers, have been completed. The scheme owes its origin to Major R. H. Mayo, the well-known consulting engineer, and the Air Ministry, as well as Imperial Airways, are interested in it.

Briefly explained, the Mayo "Leap Frog" scheme consists of joining together two separate aircraft, the upper having a high wing-loading and the lower a less high wing-loading. The two machines take off under the combined power of the engines of both, and when the desired height has been reached, the upper machine is released from the lower by means of certain devices which Major Mayo has patented. These could, of course, be arranged in a number of different ways, but an essential condition seems to be that the pilot of what may be termed the "carrier" aircraft should have full control of the combination until just a moment before the act of separation, when, it would seem, it would be preferable for the pilot of the upper machine to work the release mechanism.

Superficially, the Mayo scheme appears fantastic. One's first reaction is to jump to the conclusion that this is a very wasteful way of getting a heavily loaded aircraft into the air, and that the catapult would do it much more cheaply. Upon looking into the matter, however, certain very good reasons for adopting this method begin to appear.

If one examines the performance curves of any normal aircraft, it is seen that, from considerations connected with take-off and landing, a much larger wing area is used than is desirable for actual flying. If the wing area could be cut down to a third of the normal, for instance, and the designer were relieved of the necessity of thinking of his take-off and climb, he could design the machine specifically for cruising conditions, with the result that the machine could be flown at an angle much closer to that corresponding to best L/D. This would mean that the power required would be less for a given speed, the saving in power being used to increase the range and/or payload. Obviously, the Mayo scheme is only of advantage when flights of very considerable distances are being considered.

The orthodox aircraft cruises at an attitude usually much closer to the angle of maximum speed than to that corresponding to maximum L/D. It *must* do this in order to prevent climbing. At maximum L/D the lift coefficient is, with normal wing-loadings, so high that the engines have to be throttled to prevent climbing. But as the wing-loading goes up so does the speed at which the machine flies at that particular angle. It seems to us that it is this fact which is at the bottom of Major Mayo's idea.

That certain technical difficulties will arise is to be expected, but they should not be insuperable. And if, as seems probable, the "carrier" aircraft can be used for other work, its cost and upkeep should not prove prohibitive.

TOWARDS THE "FOOLPROOF" IDEAL

The Hammond Model Y : A Two-seater "Pusher" for the U.S. Department of Commerce

ABOUT a year ago Mr. Vidal, of the U.S. Department of Commerce, startled the American aircraft industry by stating that he believed that there was a market for 10,000 easily flown, safe aeroplanes, provided they could be sold for 700 dollars each. It subsequently appeared that he might be granted a fund to assist him in proving the truth of his contention, but the money was not forthcoming, and so he called for bids on twenty-five small economical aircraft to replace the machines in use by inspectors of the U.S. Department of Commerce. Last month a contract was awarded to the Hammond Aircraft Company, of Ypsilanti, Michigan, for fifteen of the originally specified twenty-five at a cost of 2,190 dollars each.

According to *Western Flying*, it was stipulated that the machine to be ordered must be capable of clearing a 35-foot obstacle 800 ft. from a standing start; that it must be capable of being brought to a stop within 400 ft. of the same obstacle, cleared in a straight and controlled glide by a private pilot; that no movement of the control or sudden loss of power should cause either a spin or a steep recovery dive; that the undercarriage should withstand a landing with a vertical velocity of twenty feet per second; that both pilot and passenger should have an uninterrupted view; and that the

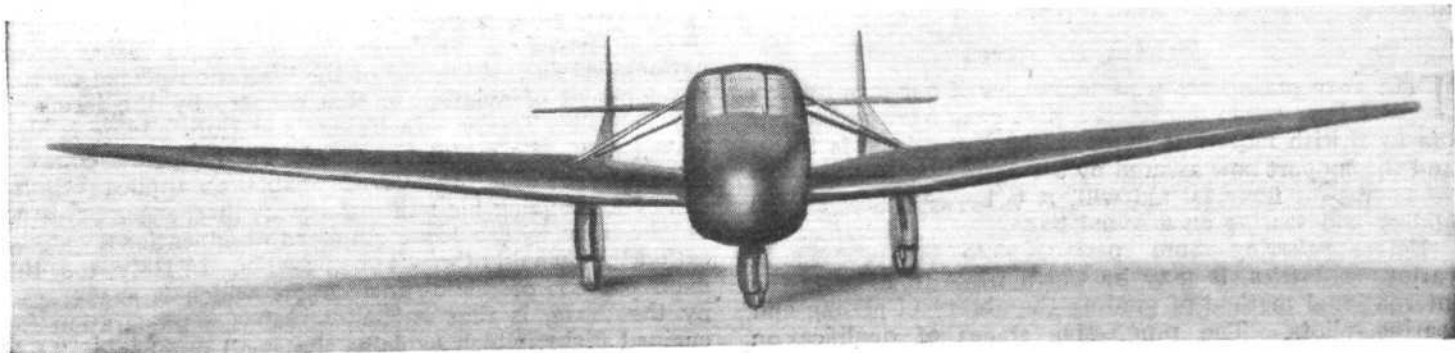
machine should be capable of being brought to a stop in 150 ft. from a ground speed of 45 m.p.h.

The Hammond Model Y will resemble few aeroplanes that have been produced during the past few years—with the exception, perhaps, of the Stout "Skycar." It will be a low-wing three-wheeled "pusher" cabin monoplane of all-metal construction with the pilot and passenger seated side by side. The tail will be carried on two booms and the engine specified is a four-cylinder inverted Menasco.

But it is in the three-wheeled undercarriage that the real interest lies. By arranging two normally braked wheels, braced through the wing by four struts to the cabin top, and an additional fully-castoring wheel in the nose, a number of operational advantages should be obtained, the most noticeable of which will be the ability to use the brakes really hard at all speeds without nosing over.

It is claimed also that the gliding angle can be made very steep for landing in small spaces, and that the actual landing can be made simply by pulling the stick back. In any control position it will be impossible to stall the machine.

A good, but not exceptional speed range is promised—35 to 110 m.p.h. Demonstrations will be made in March next year.



A castor nose wheel allows the fullest use to be made of the wheel brakes of the Hammond Model Y. This photograph is of a model.

PRIVATE FLYING

A SECTION FOR OWNER-PILOTS
AND CLUB MEMBERS

ONE cannot leave the subject of private flying in Continental countries recently visited without referring to the growth of gliding and soaring. In this direction, of course, Germany is pre-eminent. Motorless flying, which is at once a sport and an aid to science, has many aspects of usefulness, and this is everywhere becoming more and more keenly realised. In its simplest form it inculcates the fundamentals of flying in an economical way, and pilots of power-driven aircraft with years of experience can learn much (e.g., guarding against certain emergencies) from the study and practice of soaring.

The technique of motorless flying is constantly improving. With the various methods of launching now practised, the early limitations of location no longer restrict gliding and soaring to hilly surroundings. Towed launching by motor car and by aircraft makes possible the practice of sailplaning from level sites. As an example of what can be done in these conditions, one may instance the flights accomplished in this country a few years ago by Herr Kronfeld.

In order to demonstrate the possibility of thermal soaring over flat country, Herr Kronfeld undertook several flights in his wonderful sailplane, the *Wien*, which had been presented to him by the citizens of Vienna in recognition of his ability as a pilot of motorless aircraft. These flights commenced at the London Air Park at Hanworth, where the *Wien* was towed to a height of 1,200 feet, and then cast loose. On the first occasion Kronfeld was able to climb continuously up to 4,300 feet and remain in the air in the vicinity of London for several hours, landing eventually at Chatham. Repeating the performance on the following day, he found conditions less favourable, and, losing height, looked round for a suitable field in which to alight. In recounting this experience, he tells us that while thus occupied he came over a cornfield which reflected the heat of the sun, and over which a strong upward current was noticeable. Making use of this, he was able to make contact with a large cumulus cloud, which enabled him to reach a height of over 3,000 feet. On this occasion he followed a course as far as Biggin Hill Aerodrome, and was able to make the return flight *via* Croydon, and land again at his starting-point at Hanworth.

British Progress

THE very praiseworthy performances of our own leading sailplane pilots during the past year have given new life to British motorless flying. The enthusiasm is there, and the support now assured by the decision of the Government to lend financial aid will, it is hoped, place British gliding and soaring on a sound basis.

Before referring more specifically to the progress in various countries, it may be worth while to indicate the international method of grading the ability of gliding and soaring pilots. The progressive stages of qualification recognised by the *Fédération Aéronautique Internationale* are marked by the issue of three classes of certificate: "A," "B," and "C." To obtain an "A" certificate the

glider pilot has to do a straight flight of not less than thirty seconds. To qualify in the "B" class two flights of forty-five seconds' duration must be made, followed by a one-minute full figure "S" turn. The "C" certificate necessitates a flight of five minutes above the level of the starting point. A further mark of high qualification, which is not yet recognised by the F.A.I., is awarded to sailplane pilots who have proved their ability after a much more searching test. What is known as the "Silver 'C'" certificate is issued by the *International Studiekommision für den Motorlosen Flug*, a body with headquarters in Germany which invites international co-operation in technical re-

search on matters concerning motorless flight. To qualify for this distinction the pilot must have achieved a soaring flight of not less than fifty kilometres in a straight line; one of five hours' duration and one altitude flight exceeding one thousand metres above the starting level. Two of these tests can be combined in one flight, but not all three.

Certificates for gliding and soaring, differing in this respect from those issued to pilots of power-driven aircraft, do not require renewal. The figures given below are based on those issued, and cannot therefore be taken as truly indicative.

There is little doubt that motorless flying has reached the highest pitch of organisation in Germany. I cannot refer to all the activity taking place in Europe beyond indicating that few countries have not realised to some extent the importance of encouraging this branch of flying. Great strides are reported in Russia, but comparable figures are not available, as the U.S.S.R. does not belong to the F.A.I. Compared with British gliding certificates issued, which at present number 391 "A," 183 "B," and 103 "C," the German figures are very impressive, being: 7,690 "A," 5,750 "B," and 2,410 "C" licences. In contrast, the position at the end of 1933 in France was more comparable with that in this country, the figures being: 344 "A," 160 "B," and 58 "C." Belgium has several active groups, the certificates issued being: 110 "A," 45 "B," and 15 "C."

Means to an End

THE pre-eminence of Germany, as far as post-war gliding is concerned, is no doubt largely due to the urge for national service arising out of the limitation placed on the development of aviation in that country by the terms of the Versailles Treaty. In France and Italy gliding is also looked upon as a means to an end. In the former country the possession of a "B" licence enables an applicant desirous of undergoing his military service in the Air Force to obtain entry with a lower standard of educational qualification than would otherwise be possible. In Italy, too, the main purpose of gliding instruction, which is encouraged by the State, is that it shall serve as a preparation for engined flight, which explains the small number of "C" licences obtained.

It is, perhaps, difficult for those who have not contacted the gliding movement closely to realise its potentiality.

NOTES

by

LORD SEMPILL

A.F.C., F.R.Ae.S.

Pilots of power-driven aircraft, whether they be private owners of aeroplanes or engaged on air transport, can gain valuable experience from studying motorless flying at first hand. An instance of its usefulness is worth quoting from the experiences of Herr Kronfeld, who is an aeroplane pilot as well as an expert exponent of soaring. He was flying one day over difficult country in a light aircraft when his engine cut out completely and could not be restarted. In

the ordinary way this would have meant a forced landing with little hope of saving the machine. He had noticed, however, some miles back, a possible landing place which he determined to reach, although it was far beyond the normal gliding capacity of his machine. By calling on his experience as a sailplane pilot he was able to utilise every available up-current to keep his machine in the air until his objective was reached.

FROM THE CLUBS

Events and Activity at the Clubs and Schools

HANWORTH

Another very successful dinner-dance was held at the Hanworth Country Club on November 30.

Flying hours for the week totalled 26 hr. 10 min., with first solos by Lt. Com R. Wyndham, R.N., and J. Sear.

IRISH AERO

The Irish Aero Club put in twelve hours' dual and six hours' solo last week. Mr. Dagg has just joined the club, and has been endeavouring to obtain his licence before departing for Karachi.

This year Mr. Rex Good won the map-reading contest, and there should be a lot of competition among the members for the landing contest.

EASTERN COUNTIES

Approximately 200 guests attended the dance held by the Eastern Counties Aeroplane Club at the Great White Horse Hotel, Ipswich, on November 29. Debroy Somers' band provided the music.

The club was formed in August, 1931, and since then members have completed more than 6,000 flying hours, and have secured over 90 "A" and 6 "B" licences.

NEWCASTLE-ON-TYNE

A total of thirty-three hours' flying was carried out by the Newcastle Aero Club last week. Blind-flying instruction is still very popular.

The weather conditions have been very bad in the North, and the machines chartered to deliver the films of the Royal Wedding were unable to get through to Cramlington last Thursday.

The annual dinner and dance is being held on Tuesday, January 29, and, as usual, it will be held at Tilley's Barras Bridge Assembly Rooms, Newcastle-on-Tyne.

NORTHAMPTONSHIRE

During the past week the weather at Sywell has been so bad that even the birds were walking. However, out of the fog came Mr. Birkett, together with a Percival "Gull," and Mr. Wynne from Tollerton.

New members this week include Mr. Eric Foley and Mr. A. E. Catt. Mr. Abbott returned to do some flying after a trip abroad, and Mr. Norman from Heston called in for some flying on his way to Tollerton.

A dinner organised by the members of the Northamptonshire Aero Club, at which Flt. Lt. T. Rose was guest, was given to say farewell to him before he left to take up his new post as Sales Manager to Phillips and Powis. Members expressed their sincere regret that he was leaving, and wished him the very best of luck and prosperity in his new post.

During the week Midland Airways, Ltd., had their first charter.

BROOKLANDS

Weather was a little better last week, and the club had several good flying days. A total of 33 hr. 20 min. was flown by the Brooklands Flying Club. First solos included Messrs. Graves and Sorapure, and Major Thompson, who is fifty-eight years old and completed his first solo after twenty hours' instruction. Messrs. Sladen and Prewett passed their tests. The instructors now have their own office next to the Control Office.

Captain Davis, Mr. O'Connell, and Mr. Van Markem—who flew over from Holland for the occasion—motored up to Northampton for the farewell dinner and dance to Flt-Lt. Tommy Rose, who is leaving the club. The College of Aeronautical Engineering Rugby team played their first match of the season against the Old Kingstons on Saturday last, and a very good game resulted in a win for the College—24 points to nil.

"Coming events" include a tea-dance at the Club on December 16 and the staff annual dinner at the Ship Hotel, Weybridge, on December 14.

YORKSHIRE

More than 200 guests were present at the Yorkshire Aeroplane Club's annual ball, held at the Hotel Majestic, Harrogate. Seventeen hours were flown by the club at Yeadon last week.

LIVERPOOL

During the last fortnight in November the Liverpool Club flew 58 hr. 55 min. at Speke and Hooton, bringing the year's total to 2,400 hours. Actually the last month's figures show an increase of 35 hours over the corresponding month of 1933.

MIDLAND

The flying time at Castle Bromwich for the week which ended on November 29 were: Dual, 8 hr. 35 min.; and solo, 15 hr. 25 min. Cross-country flights were made to Towcester and Bedford.

Three new members have joined, and Mr. G. J. Wilkinson passed his licence tests. Among the many visitors last week was Lady Nelson, who brought her Stinson from Kildonan, Ireland.

CAMBRIDGE

The week ending December 1 was exceptionally busy, owing to the fact that several members of the Cambridge Aero Club and Marshall's School were trying to complete their tests before the end of term; 28 hr. dual and 21 hr. solo were flown with a new "A" licence by N. K. Walker and a renewal by B. F. Marriage. The club took delivery of another machine to deal with the large increase in flying hours.

Ten members of the Civil Flying Corps attended on Sunday, November 25. Visibility very poor, so they were only able to put in three and a half hours' flying, and the rest of the time was spent on ground instruction.

READING

The Scandinavian contingent, consisting of Messrs. Herricksen, Walter and Bernhoft, left Reading Aerodrome last Sunday for Oslo in a three-seater "Hawk Major," and Mr. A. Reedtz, with another fellow-countryman, left in a "Cirrus Hawk" for Copenhagen. The three-seater is fitted with a coupé head over the passengers' seats. Another "Hawk Major" is destined for Greek ownership. This machine is painted jet black in its entirety, and looks very well indeed.

The Reading Cub will shortly be bidding a temporary farewell to one of its most popular members, Mr. Glen Ogilvie, who is off on a four months' visit to America. Mr. Ogilvie has been with the club from the very early days, and will be very much missed.

CINQUE PORTS

Since the last report Mr. R. J. de Brett has passed his "A" licence tests, and Mr. V. P. Budge made a first solo. Both are doing a course at the Small Arms School, Hythe. Mrs. G. B. Wilkins also soloed. Flying times for the week, both dual and solo, showed a slight improvement, the total amounting to just over twenty-four hours.

Once again the aerodrome was occupied by innumerable air liners forced to land here owing to dense fog around Croydon. The club joined in the Royal wedding celebrations in Hythe on Thursday by parading an aircraft in the torch-light procession.

Capt. L. A. R. Braddell has resigned from the club committee, and Mr. S. E. T. Symmons has taken his place.

To-morrow, December 7, the club is holding a December dance at the Grand Hotel, Dover. The club will be closed from December 24 to 27 inclusive, but will be open on the morning of Boxing Day for joy-riding and a gathering of members. It will also be closed over the New Year from December 31 to January 3 inclusive.

CORRESPONDENCE

The Editor does not hold himself responsible for opinions expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters intended for insertion in these columns.

FROM AUSTRALIA

[2982] With the Speed section of the Melbourne Centenary Air Race already decided, I should like, through your columns, to congratulate Messrs. C. W. A. Scott and T. Campbell Black on their glorious victory, and also the De Havilland Aircraft Company.

The Race has reopened avenues for fresh criticism, particularly with regard to the proposed London-Brisbane air service. Messrs. Parmentier and Moll are to be congratulated on their fine flight, and, although it was carried out under near racing conditions, it has shown that a six-day service to Brisbane is easily within the scope of existing modern air liners, in direct contrast to the proposed twelve-day schedule, and no longer can Imperial Airways offer the excuse of comfort for speed, as the Douglas machine has shown to us Australians a wonderful combination of both these characteristics. [Recent issues of *Flight* will have answered our Australian correspondent on this point.—Ed.]

The event has also opened the way for criticism with regard to retractile undercarriages. Although the first and second machines in the Speed section were equipped with this type of undercarriage, it seems that other entrants experienced a good deal of trouble with their retractile undercarriages. Although they may account for a loss of 4 per cent. to 5 per cent. in speed, undercarriages well faired by "trousering," as fitted to Northrop machines, seem to be most efficient as regards safety and weight.

Press reports here have revealed that critics in America and Italy have openly stated that the rules governing the control of the race were drafted so as to favour British machines. If this is true, it is to be deplored, for if any machines could be considered as favoured they were those built outside Britain in countries with three to four years' experience in the construction of high-speed aircraft, such as America.

Gordon, N.S.W.

WILLIAM D. FREEMAN.

UNORTHODOX MACHINES

[2983] Surely your correspondent "B. S. H." in *Flight* of October 29 does not seriously consider that the conventional light aeroplane of to-day is little superior in performance and manners to the B.E.2 of 1913?

Taking only one of the numerous successes of the light aeroplane, that of the recent record flight to Australia by a Miles "Hawk" shows the untruth of such a statement. It is quite obvious that the advance in performance, reliability and safety of the modern light plane stands no comparison with a B.E.2—though they were something of an achievement in their time.

Just because no freak machines were exhibited at the recent Paris Aero Show why say that the industry has ceased to produce brains? What rot! Aero shows are mainly for the purpose of showing to the public and industry established and reliable products. The real pioneer designer is too busy for shows, and his money is all needed for the progress and development of his expensive and stubborn child.

Apart from the Autogiro and the "Pterodactyl," I can think of quite a few unorthodox machines which are being experimented with. There is the machine with a circular wing; the machine with its fuselage enveloped by a cylindrical form; and the machine with rotor blades arranged in the form of paddles on either side of the fuselage instead of the usual form of wings. The Autogiro and the "Pterodactyl" are far enough advanced now to be considered out of the freak stage, and both have commercial and military value. And yet here we have someone telling us that designers will be content to sit back in their armchairs—more rot! Why, even the orthodox aeroplane is rapidly changing in style day by day, and refinements such as retractile undercarriages, air brakes, wheel brakes, navigation aids, etc., are making the aeroplane more and more perfect.

R. E. WILCK.

London, N.W.7.

A Broadcasting Station for Weather Reports

A national aviation meteorological station, broadcasting programmes consisting only of weather reports, weather forecasts, and warnings for airmen is to be erected by the Marconi Company on behalf of the Air Ministry at Cranwell, Lincolnshire. Meteorological bulletins will be transmitted at regular intervals throughout the day.

The station will have an energy of two kilowatts in the aerial, and its messages are expected to be easily receivable over a wide area of Great Britain. No interference will be caused with B.B.C. programmes, for it will operate on 1,158 m., the wavelength now used by Heston, which it will supersede.

It is probable that most airports and flying clubs will install suitable receivers to enable their users and members to listen in to the Air Ministry weather broadcasts from the new station, which should thus prove to be a further valuable contribution on the part of wireless to the safety of civil aviation.

The actual announcing will be done from the Meteorological Office of the Air Ministry in London, and the station is expected to be opened early in the summer of next year.

Another Portuguese Meeting

So that the inhabitants of the North of Portugal might enjoy a treat similar to that given at Amadora (near Lisbon) on November 4, a repetition of the show was given near Oporto on November 11. A suitable site, which will be the Oporto aerodrome of the future, was prepared, and the display went off very successfully, a large crowd attending. It is estimated that the proceeds will provide something like £1,500 for the widow and small son of the late Capt. Abreu.

Novak, the Czecho-Slovak flier, did not take part, he having left for Prague some days before. His place was taken by Mlle. Hélène Bouchere, the well-known French record breaker, who has since, as recounted on page 1298, unfortunately met with a fatal accident.

Ground Instruction for Owner Pilots

How many owner pilots really know their aeroplanes? What happens to them when touring in foreign countries? Airwork, Ltd., has instructed many private aeroplane owners in ground handling and maintenance of aircraft. This has been done by arrangement, and on no special system.

Realising that the increased output of licensed pilots demands a fuller scheme of ground instruction, Airwork has secured the services of Mr. H. Vaisey, who, in the course of long experience in such work, has evolved a system of lectures combined with actual practice by the pupils of the points demonstrated. These lectures are given by appointment, not to classes, but to individuals, who thus gain for themselves the full benefit of each hour's working demonstration.

Three alternatives are offered: a short course of eighteen lectures at an inclusive cost of £5 5s.; a long course of thirty-six lectures at £10 10s.; or selected lectures from either course at 7s. 6d. each.

R.A.F. Benevolent Fund

Lord Wakefield has been elected a member of the Council of the R.A.F. Benevolent Fund, and has accepted the chairmanship, in succession to Sir Charles McLeod, who has resigned.

"Records" by Stack

His many friends all over the world will be interested to learn that Capt. Neville Stack has made some records of the favourite songs with which he has so often entertained aviation gatherings. Accompanied by Mr. Dan Carroll on the banjo, he has produced some most entertaining results, and the recording, by the "Permarec" system, is as good as any we have heard. Those he is offering for sale, from No. 7, Park Lane, London, W.1, are: "Samson and Delilah," "The Ladies," "Rosy Cheeks," "So Early in the Morning" [Shades of the R.F.C. 1—Ed.], "The Persian Kitten," and "Chotapeg Blues." The last is Stack's own composition.

LIQUID-COOLED ENGINES

Their Application to High-speed and Other Aircraft : A Résumé of a Paper Read Before the R.Ae.S. by Capt. A. Graham Forsyth

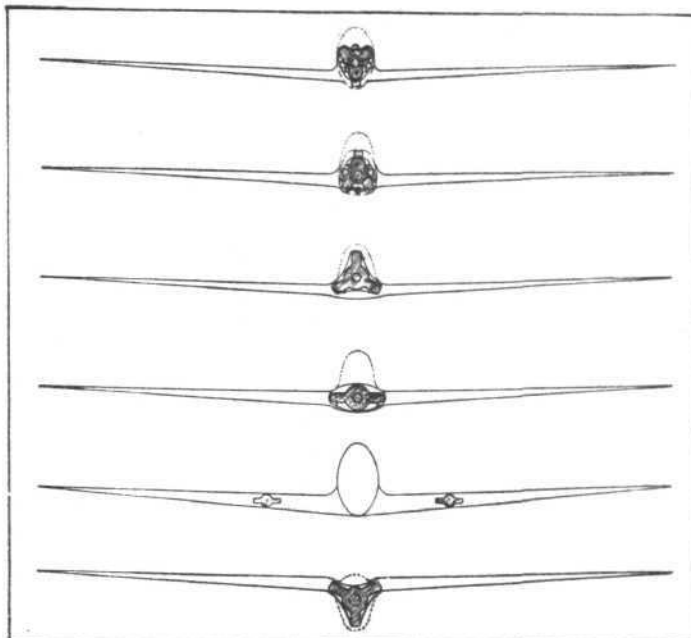
BEFORE the Royal Aeronautical Society last Thursday, Capt. A. Graham Forsyth read a paper entitled "Liquid-Cooled Engines—Design and Application to High-speed and Other Aircraft." Although a champion of the liquid-cooled engine, Captain Forsyth made it quite clear that he did not consider the air-cooled engine of no value. On the contrary, he thought it an excellent example of aeronautical engineering, and recent flights had proved that the liquid-cooled engine had a real rival in the air-cooled. Owing to the great improvements made in the cowling of air-cooled engines, the difference between the power absorbed by the cowed air-cooled as compared with the liquid-cooled type had been narrowed down, and on the latest type air-cooled cowlings the drag figures were nearly as good as those obtained from a normal water-cooled system. This meant that further improvements would have to be made in the installation of the liquid-cooled type in order that it might retain its supremacy over the air-cooled. The introduction of evaporative cooling and the use of ethylene glycol as a cooling medium had still further reduced the drag of the liquid-cooled installation.

While on the subject of improvements in aircraft the lecturer stated that in 1934 we were endeavouring to produce single-seater fighters with speeds approaching 250 m.p.h., whereas with our experience we should be producing bombing aircraft with a speed of 250 m.p.h. and single-seaters capable of 300 m.p.h. In America commercial aircraft had been produced with speeds up to 220 m.p.h., fitted with air-cooled engines. The increase in speed had been gained by carefully studying the aerodynamic qualities of the aircraft. Generally speaking, the aircraft side of the American machines could not be greatly improved unless some revolutionary change in design came along.

Speed of British Aircraft

Of British aircraft the lecturer said that, although the construction left nothing to be desired, a great deal could be done to improve the speed by paying greater attention to details. Such items as projecting guns, oil coolers, navigation lamps, bomb racks, etc., required scrapping, and could easily be replaced by producing up-to-date equipment properly streamlined. The retractile undercarriage would also need developing if we were to have any hopes of competing against modern aircraft using every known device to improve speed.

His reason for introducing the foregoing was to establish the fact that it was not worth while considering the engine side unless it was taken for granted that the aircraft in which it was to be installed would be of an up-to-date type. As it was his belief that for powers over 700 b.h.p. it might be necessary to revert to liquid-cooled engines, the lecturer stated he would indicate where he considered improvements could be made in regard to choosing the right type of engine for various types of aircraft.



Fairing-in the cylinder blocks: some arrangements discussed by the lecturer.

The installation of liquid-cooled engines had been simplified in recent years. Previously there were radiators on the side of the fuselage and header tanks in the top plane, with a considerable amount of piping running everywhere in the fuselage. The raised position of the pilot had enabled a simple installation to be adopted which consisted in a combined header tank and separator large enough to carry reserve water, coupled to an under-slung radiator. It was his opinion that ordinary water cooling would die out and would be replaced by evaporative cooling or ethylene-glycol cooling. The radiator required for glycol cooling was approximately one-third the size of a water-cooling radiator designed for English

summer conditions. There was a great deal to be said in favour of evaporative cooling with wing condensers, as their introduction eliminated all radiator drag. It had been demonstrated that there was very little steam lost when the condenser was punctured by gunfire.

Advantages of Liquid-cooling

Points advanced in favour of liquid-cooled engines were: the design allowed a small engine to be installed in the best fuselage shape; when used in conjunction with a suitable cooling system the drag was reduced to a minimum; when tandem engines were used the engines would function equally well as pushers or tractors; engines could be fitted with reduction gear which enabled the airscrew shaft to be located in the best possible position relative to the engine shaft, thereby producing the best cowling lines; the construction of the airscrew shaft and drive made it possible to house the operating gear for a variable-pitch airscrew inside the engine, and in certain cases it was possible to arrange for a gun to be fired through the bore of the airscrew shaft; the engine speed was not so limited as on air-cooled engines; owing to the high revs. it was possible to run with high compression ratios, which resulted in economic fuel consumption; oil consumption was difficult to control in any high-speed engine, but the liquid-cooled engines scored due to the possibility of adopting a lower piston clearance than was generally used in air-cooled engines; liquid-cooled engines were generally lighter than air-cooled radials of the same power; in large aeroplanes the coolant could be used for heating purposes; in large flying boats, auxiliary sets were used for lighting, pumping, etc., which could be liquid-cooled and coupled to the main cooling system, thus providing a means of keeping the main engines at a temperature to prevent freezing; liquid-cooled engines could be installed inside the fuselage or wings, thus making them accessible in flight; and, finally, the liquid-cooled engine was more silent in operation than the air-cooled. From the point of view of weight the liquid-cooled engines scored when the duration was over five hours.

Criticising the policy of regarding the present aeroplane as the best method of wasting power, and the idea that

the only method of gaining speed was to fit larger and still larger engines, Captain Forsyth said De Havillands had proved that the speed could be increased by careful design. The De Havilland "Comet" was faster than some single-seater fighters. It was obvious that a smaller fuselage cross-section could be obtained behind a liquid-cooled "V" engine than behind an air-cooled radial and still give the pilot a good view. In a fighter aircraft the use of a "V"-type engine gave a simplified gun position, as the guns could be conveniently placed alongside the engine at the base of the cylinder blocks. In addition, on certain engines, a third gun could be arranged to fire through the airscrew shaft.

For private and small commercial aircraft the lecturer thought it would be generally agreed that the smaller air-cooled in-line engine was the most suitable. It was, however, possible that at some future date the fashion might change and an in-line liquid-cooled engine be used.

At present nearly all the high-speed records were held by aircraft having liquid-cooled engines, and he thought that in America there would soon be a change over to liquid-cooled engines in certain racing and fighter aircraft. America had already produced a fighter with a glycol-cooled engine which showed a considerable gain in speed over the air-cooled-engined aircraft.

From a development standpoint the liquid-cooled engine gave greater scope, and, also, the shape of the engine could be modified to suit the particular installation. Taking the Napier "Lion" and the Rolls-Royce "R" engine as examples, it was seen that the cylinder blocks had been formed to blend in with the cowling lines. The broad-arrow engine was more difficult to install than the 60 deg. "V."

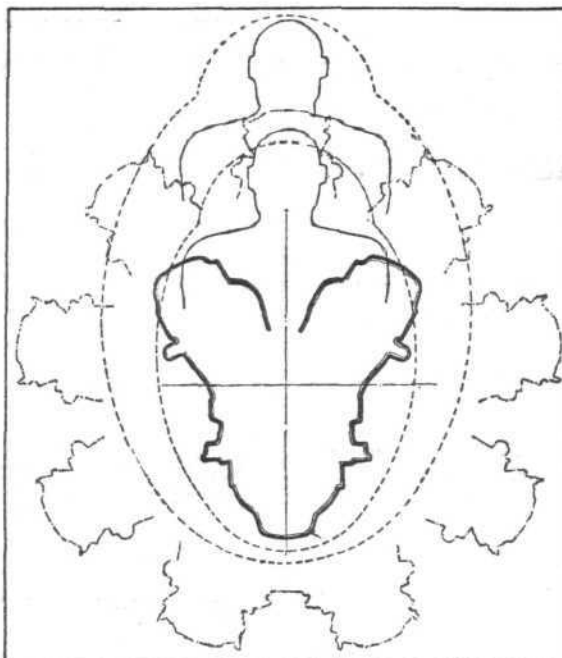
The original "Lion" developed 400 b.h.p. By modifying the design and increasing the speed the power was increased to 900 b.h.p., which equalled 37.57 b.h.p. per litre. The supercharged engine fitted in the Gloster VI developed 56.35 b.h.p. per litre.

The Rolls-Royce "R" engine in the Schneider machine developed 2,200 b.h.p., which was equal to 59.94 b.h.p. per litre. At a later date the power was raised to 2,600 b.h.p., which represented 70.84 b.h.p. per litre. It had been predicted that air-cooled engines of the future would develop 40 to 50 b.h.p. per litre, which was well below that of the present-day liquid-cooled racing engine.

Fairing-in Cylinder Blocks

During the development of racing engines, shapes other than the broad arrow and 60 deg. "V" were considered, but had to be dropped as it was found impossible to produce and develop a new shape of engine in time. The Gloster biplane had the top planes faired into the cylinder blocks of the "Lion" engine.

The lecturer outlined the development of this scheme of fairing into the cylinder blocks, the various proposals being shown in the front elevations (see heading sketch on page 1305) of different low-wing cantilever monoplane designs and one high-wing monoplane design. The engine was to be constructed with three blocks of six cylinders each spaced 120 deg. around the crank case. This arrangement—an inverted "Y"—allowed two of the banks to be faired into the ends of the wings. It was found that the view would not be too good, but a gain in speed of about 20 m.p.h. should be obtained due to reduced head resistance. The low-wing type still had the objectionable exhaust system on the centre block in line with the pilot's head, and



The Pilot's View: Air-cooled radial and liquid-cooled "V" engines—a comparison.

the upright "Y" engine, shown in the diagram of the high-wing monoplane, was considered the better installation of the two, although the gain in speed was reduced slightly, due to the centre block projecting underneath the nose.

There were considerable difficulties in producing such an engine, as the crankshaft had to be inserted through the end of the crank case. Investigations into the possibilities of the horizontally opposed engine were interesting. The engine considered was a sixteen-cylinder type having two banks of eight cylinders each set at an angle of 198 deg. This angle gave the correct firing sequence and conformed to the dihedral of the planes.

Turning to fighting aircraft, it was the opinion of the lecturer that the racing engine of to-day should become the Service single-seater fighter engine of to-morrow. The single-seater fighter should not be a

target for fast commercial aircraft, but should be a machine capable of outflying any known type. The function of the type was to carry a gun and the pilot to the maximum ceiling in the shortest possible time. At present the development of the single-seater fighter engine was crippled by type-test conditions, and also by the necessity of installing universal types of engines which could be used in heavy bombers when required. Racing engines had to pass a test of one hour's duration at full throttle, and if developed to run at two-thirds of their power they would pass a 50-hour type test. At present they had to undergo a full type test of 100 hours compared with the 50-hour test required for civil engines. As the general duration of flight of a single-seater fighter was 3½ hours, it would improve the performance of the aircraft if the type test were reduced to civil duration.

Standardising Starting Methods

The method of starting should be standardised. At present engines had to have provision made for at least three types of starting. The engines for two-seater fighters should be similar to those required for the single-seater type. Engines intended for day bombers should, owing to the larger duration of flight of this type of aircraft, complete a full service-type test.

In discussing large commercial aircraft the lecturer referred to the recent flight of the Douglas to Australia; he said he thought the machine's performance might be still further improved by installing liquid-cooled engines, as the combined frontal area of engine and radiators would be reduced to 12 sq. ft. compared with the 23 sq. ft. of frontal area of the radial engines used.

Capt. Forsyth thought the compression-ignition engine would in all probability come into use in long-range aircraft. At present these engines were heavier than the petrol type, but in aircraft with a duration of more than 7½ hours the additional weight of the engine was compensated by the reduced weight of fuel. In the present form of the compression-ignition engine it appeared that the only practical installation was in large commercial single-engined aircraft. If the horizontally opposed Diesel were provided with a propeller-shaft extension it could be installed horizontally inside the wing section. One difficulty that might be experienced was that this position was close to the ground, and it might be difficult to provide sufficient ground clearance of the airscrew.

In the matter of bombing aircraft, said the lecturer, British bombing machines could be outdistanced by certain civil types. He thought the most suitable engine for large bombing aircraft was the 60 deg. "V" liquid-cooled type,

as the installation was simple and, due to the large wing areas used, there was no difficulty in providing a simple glycol cooling system or evaporative system using wing condensers. A great improvement in take-off could also be obtained by using a multi-speed supercharger and variable-pitch airscrew. For large flying boats also, he considered the "V" engine to be the most suitable. Engines could be placed in tandem, as in the Short R.6/38.

Speaking of future developments, the introduction of variable-pitch airscrews might enable improvements to be made in engine performance. For instance, the terminal velocity dive condition would be eliminated from the type test, and also the take-off condition. These new conditions would allow the compression ratio to be raised and improve the power and fuel consumption. Also, the normal speed could be raised to somewhere approaching the original maximum r.p.m.

The following were the improvements which the lecturer considered could be made to an existing engine without modifying the construction, with the exception that the supercharger capacity would have to be raised to cover the increased power output and to maintain its existing rated altitude; the engine would be fitted with a variable-pitch airscrew governed to control the r.p.m., the boost control to be continually in action. Starting with an engine under present conditions with a speed range from 2,000 r.p.m. to 3,250 r.p.m., these speeds covering the take-off r.p.m. and T.V. dive conditions, Capt. Forsyth said the normal rating of the engine was 600 b.h.p. at 2,500 r.p.m. In take-off conditions at plus boost the engine would develop 700 b.h.p. per take-off at 2,240 r.p.m. Under the two conditions the b.m.e.p. would be 191 and 146 respectively, the mean being 168.5. With the controlled variable-pitch hub fitted the speed of the engine could be raised to 2,700 r.p.m., and, with an m.e.p. of 168.5, the engine would develop 740 b.h.p. The lecturer suggested that under type-test conditions the engine would satisfactorily get through a test at nine-tenths of 740 b.h.p. at 2,700 r.p.m. At present the weight-power ratio of the engine was 1.6 lb. per h.p. at normal power. This would be reduced to 1.31 lb. per b.h.p., allowing an additional 30 lb. weight for the oversize supercharger.

Comparative Power Outputs

During the last few years the liquid-cooled engine had been extensively developed, with the result that the b.h.p. per litre had been raised from 22.6 to 28.3 at normal power. This improvement had been gained by increasing the engine speed and boost pressure and by the introduction of 87 octane fuel. So far advantage has not been taken of the possibility of raising the compression ratio. When the variable-pitch airscrew became standardised it would be possible to take greater advantage of this fuel by raising the compression ratio, owing to the increased speed at which the engine would be run.

Comparing the present liquid-cooled engines with existing radials, the capacity of a liquid-cooled engine of 600 b.h.p. averaged 21.2 litres, whereas the figure for the radial engine was 29.5 litres, the powers developed being 28.3 b.h.p. per litre for the liquid-cooled and 20.4 b.h.p. per litre for the air-cooled. By making use of the improvement in fuel and of the possible increase in r.p.m., Capt. Forsyth thought it would be possible to produce an engine for single-seater fighters having a capacity of 26.2 litres and developing 1,000 b.h.p. at 3,000 r.p.m. for an all-up weight of 1,000 lb.

In referring to the Napier "Dagger" engine the lecturer pointed out that at 3,600 r.p.m. this engine developed 37.3 b.h.p. per litre, and at 4,000 r.p.m. 41 b.h.p. per litre, which was very much higher than had been obtained from any other type of aero engine (apart from racing engines) fitted in this country. In France the Hispano Company had obtained some interesting figures with their Y.Brs. type engine. For a capacity of 36 litres this engine developed 846 h.p. at 13,000ft. and 2,400 r.p.m., which was equal to 23.6 b.h.p. per litre. The weight of this engine, including piping, was 1.18 lb. per h.p. The

greatest saving in weight appeared to have been effected by adhering to two valves per cylinder. The gas speed through the valves was considerably higher than was the case in this country, and it would be impossible to obtain the m.e.p.'s at which we were at present running on engines using two valves per cylinder. Other weight reductions in this engine had been effected by making provision for gas starting only, and by a very light reduction gear, made possible by arranging the airscrew to bolt direct on to a flange on the airscrew shaft.

The weight of British engines could be reduced considerably if magnesium could be used as a general material for crank cases, etc. At present we produced engines for a universal purpose, but if we were to decide to produce a Service engine for a specific type of aircraft it would be possible to reach a figure of 116 per b.h.p. and still have an engine which would satisfactorily pass a 50-hour type test. To enable this to be done, it would be necessary for all superfluous auxiliaries to be removed and for only one type of starting to be employed.

Possible Supercharging Improvements

Up to the present the development of higher powers has been achieved by the use of superchargers. In nearly every case mechanically driven centrifugal superchargers were used, and the lecturer thought the centrifugal type would remain with us for some time, but that considerable improvements would be made in connection with the method of driving. At present it was the general practice to fit the carburetter "before" the supercharger. This had the advantage that it reduced fire risk and also reduced the number of component parts fitted to the engine, but it led to trouble in cold weather, as there was a tendency for liquid fuel to build up in the supercharger, and volute under slow-running conditions, with the result that there was a danger of the engine cutting out during take-off.

In the case of the engine fitted with carburetters "after" the supercharger, the building-up trouble was avoided, but the system suffered from other disadvantages. For example, the engine might run satisfactorily on the test bench, but when it was installed in an aircraft it was generally found necessary to retune the carburetters, the conditions having altered due to air intake, etc. The carburetters had to be pressure-fed, and, as they were generally located near the exhaust pipes, with a number of pipes leading to the various carburetters, in the event of a pipe breaking the fire risk was great.

The lecturer thought exhaust-driven superchargers should be reconsidered, previous experiments having proved successful. Inter-coolers were used for the previous experiments, but he thought that if the driven turbine had been isolated from the supercharger rotor it would not be necessary to use inter-coolers.

Fuel-injection Experiments

Turning to the subject of fuel injection, Capt. Forsyth thought this would overcome the difficulties of building-up and fire risk, as it would be possible for the atomisers to be inserted inside the cylinder blocks in such a position that the breaking of a fuel pipe would not allow fuel to be spread to the exhaust pipe. Trouble with building-up would be eliminated by the fact that the supercharger would only be delivering air.

In connection with fuel injection, a great deal of experimental work was being undertaken, and good results have been obtained, but it was impossible at present to give a definite indication as to what would be the ultimate results of the experiments. He thought a great deal was to be gained by using fuel injection. In America they were testing out two schemes, (a) injecting the fuel directly into the cylinder, and (b) injecting it into the induction pipe. He thought it probable that the latter scheme would be the better, as it was possible that it would reduce the number of atomisers and also the weight of the fuel pumps. A further advantage of fuel injection

(Continued on p. 1309.)

THE ROYAL AIR FORCE

Service Notes and News



Air Ministry Announcements

CHANGES IN THE HIGHER COMMANDS

The Air Ministry announces the following appointments:—

Air Marshal Sir Edgar R. Ludlow-Hewitt, K.C.B., C.M.G., D.S.O., M.C., now Director of Operations and Intelligence and Deputy Chief of the Air Staff at the Air Ministry, to be Air Officer Commanding, Royal Air Force, India, in March, 1935. vice Air Marshal Sir John M. Steel, K.B.E., C.B., C.M.G.

Air Com. C. L. Courtney, C.B., C.B.E., D.S.O., now Director of Staff Duties at the Air Ministry, to be Director of Operations and Intelligence and Deputy Chief of the Air Staff at the Air Ministry, on January 26, 1935, vice Air Mar. Sir Edgar R. Ludlow-Hewitt, K.C.B., C.M.G., D.S.O., M.C.

Air Com. A. S. Barratt, C.M.G., M.C., to be Director of Staff Duties at the Air Ministry on January 12, 1935, vice Air Com. C. L. Courtney, C.B., C.B.E., D.S.O.

Grp. Capt. J. S. T. Bradley, O.B.E., to be Director of Equipment at the Air Ministry on January 14, 1935, vice Air Com. A. W. Bigsworth, C.M.G., D.S.O., A.F.C.

AIR MARSHAL SIR EDGAR R. LUDLOW-HEWITT was appointed to the Royal Flying Corps from the Royal Irish Rifles in August, 1914. He served in France from March, 1915, with intervals, until the end of the war and, besides receiving the C.M.G., D.S.O., and the M.C., was on a number of occasions mentioned in despatches.

Subsequently he was employed at the Air Ministry for several years, and in turn held the posts of Deputy Director of Training and Organisation, Air Secretary to the Secretary of State for Air, and President of the Aerodrome Board. He was Air Aide-de-Camp to His Majesty the King during 1921-23, and in June, 1923, was promoted to the rank of Air Commodore. From May 1926, to September, 1930, he was Commandant of the Royal Air Force Staff College, and in the Birthday Honours List, June, 1928, was appointed Companion of the Order of the Bath. He was promoted to the rank of Air Vice-Marshal in January, 1930, and in October, 1930, was appointed Air Officer Commanding, Iraq Command.

In January, 1933, he was appointed Knight Commander of the Order of the Bath, and was promoted to his present rank in July last. Since February, 1933, he has been Director of Operations and Intelligence and Deputy Chief of the Air Staff at the Air Ministry.

AIR COM. C. L. COURTNEY was commissioned in the Royal Navy in 1909 as a Sub-Lieutenant and subsequently served with the Royal Naval Air Service and Royal Air Force in Belgium and France during the Great War.

Later he became Deputy Director of Equipment at the Air Ministry and also served with the Royal Air Force in India, and as an instructor at the Royal Air Force Staff College. He was promoted Group Captain in January, 1925, and in January, 1929, was appointed Deputy Director of Operations and Intelligence at the Air Ministry, which post he held until he was posted to the Iraq Command as Senior Air Officer in December, 1930. He was promoted to his present rank in

January, 1931, and appointed Director of Training at the Air Ministry in February, 1933, and Director of Staff Duties in April last.

For his services during the war he was awarded the D.S.O. and C.B.E., and received a mention in despatches besides having foreign orders bestowed on him. In May, 1932, he received the award of C.B. in connection with the operations in Southern Kurdistan, during the period October, 1930-May, 1931.

AIR COM. A. S. BARRATT was appointed to a temporary commission in the Royal Flying Corps from the Royal Artillery in June, 1914. In September, 1914, he was posted to France, where he served, with intervals, until the end of the war, and, for his services, he has received the C.M.G., M.C., and three foreign decorations, besides being mentioned in despatches on four occasions. In 1919 he was granted a permanent commission in the Royal Air Force and was employed at the Air Ministry until 1921. Since then he has filled several appointments on Air Staff duties and in command of the School of Army Co-operation and No. 1 Indian Group respectively. He was promoted to his present rank in July, 1932, and appointed Senior Air Staff Officer, Headquarters, India, in September of that year.

GRP. CAPT. J. S. T. BRADLEY was appointed 2nd Lieutenant in the Army in 1914, and in August, 1918, was specially employed in the Royal Air Force with the temporary rank of Lieutenant-Colonel. In September, 1919, he was granted a permanent commission in the Royal Air Force and afterwards was employed on Air Staff Duties at Headquarters, Inland Area, until given command of No. 14 Squadron in December, 1921. Since January, 1924, Grp. Capt. Bradley has frequently been employed on Staff Duties. He was promoted to Wing Commander in 1926 and to his present rank in July, 1931. For his services during the war he was awarded the O.B.E.

R.A.F. RUGBY

Results of matches in the Preliminary Round of the R.A.F. Rugby Inter-Unit Cup competition:—Cranwell beat Waddington by 27 pts. to 3; Henlow beat Bircham Newton (walk over); Mildenhall beat Martlesham by 19 pts. to nil; Upper Heyford beat Halton by 12 pts. to 11; Hendon beat Hornchurch by 14 pts. to nil; Eastchurch beat North Weald by 16 pts. to nil; Uxbridge beat Hawkinge by 23 pts. to 16; Biggin Hill beat Ruislip by 21 pts. to 10; Northolt beat Farnborough by 6 pts. to 3; Gosport beat Andover by 8 pts. to nil.

R.A.F. BENEVOLENT FUND

The usual meeting of the Grants Committee of the above fund was held at Iddesleigh House on November 27. Mr. W. S. Field was in the chair, and the other members of the committee present were Mrs. L. M. K. Pratt Barlow, O.B.E., Air Com. B. C. H. Drew, C.M.G., C.B.E., and Wing Com. H. P. Lale, D.S.O., D.F.C. The committee considered a number of cases, and made grants to the amount of £345 9s. 3d. The next meeting was fixed for December 18.

ROYAL AIR FORCE GAZETTE

London Gazette, November 27, 1934

General Duties Branch

F/O. A. C. Watson is promoted to the rank of Flight Lieutenant (Aug. 22).

Sqd. Ldr. R. W. Chappell, M.C., is granted the acting rank of Wing Com. (unpaid) (Nov. 23).

Sqd. Ldr. A. C. Collier is granted the acting rank of Wing Com. (unpaid) (Nov. 28).

Wing Com. J. H. Herring, D.S.O., M.C., relinquishes the acting rank of Group Captain (Oct. 1).

Wing Com. D. Stewart, M.C., A.F.C., is placed on the retired list on account of ill-health (Nov. 27).

Sqd. Ldr. C. F. Gordon, O.B.E., M.C., D.F.C., is placed on the retired list at his own request (Nov. 8).

Flt. Lt. B. T. Hood is placed on the retired list (Nov. 26).

Flt. Lt. G. S. White is transferred to the Reserve, class A (Nov. 24).

F/O. R. T. S. Morris is transferred to the Reserve, class A (Nov. 20).

The short service commission of Acting Pilot Officer on probation W. C. A. Lodge is terminated on cessation of duty (Nov. 24).

Medical Branch

Group Capt. J. MacGregor, M.C., M.D., C.M., L.R.C.P. and S., is placed on the retired list (Nov. 23).

Memoranda

The permission granted to Lt. M. A. Lovell to retain his rank is withdrawn on his conviction by the civil power (Oct. 10).

The permission granted to Hon. 2nd Lt. G. H. V. Bacon to retain his honorary rank is withdrawn on his enlistment in the Royal Army Pay Corps (Supplementary Reserve) (Oct. 17).

ROYAL AIR FORCE RESERVE

*Reserve of Air Force Officers
General Duties Branch*

H. G. Henley is granted a commission as Flying Officer in class C (Nov. 13).

Lieut. Com. E. J. E. Burt, R.N. (Retd.) is granted a commission as Flying Officer in class A (Nov. 17).

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

General Duties Branch

Flight Lieutenants.—R. E. Bain, to No. 605 (County of Warwick) (B) Squadron, Castle Bromwich, 19.11.34. D. H. F. Barnett, to Cambridge University Air Squadron, Duxford, 19.11.34. W. L. Bateman, to Headquarters, R.A.F., Halton, 17.11.34. F. E. Bond, to No. 802 (F.F.) Squadron, Netheravon, 21.11.34. H. K. Goode, D.S.O., D.F.C., to Station Headquarters, Hendon, 21.11.34. O. R. Pigott, to No. 23 Group Headquarters, Grantham, 21.11.34. C. E. St. J. Beamish, to No. 2 Flying Training School, Digby, 16.11.34. E. C. Delamain, M.C., to School of Photography, S. Farnborough, 20.11.34. W. J. H. Lindley, to Aircraft Park, India, Lahore, 1.11.34. V. Q. Blackden, to No. 5 Flying Training School, Sealand, 17.11.34. G. F. Overbury, to No. 207 (B) Squadron, Bircham Newton, 26.11.34. W. P. J. Thomson, to No. 12 (B) Squadron, Andover, 14.11.34. L. R. W. Tillard, to No. 2 (Army Co-operation) Squadron, Manston, 20.11.34.

Flying Officers.—T. J. MacDermot, to No. 4 Flying Training School, Abu Sueir, Egypt, 16.11.34. L. W. C. Bower, to Central Flying School, Wittering, 26.11.34. G. R. A. Elsmie, to Central Flying School, Wittering, 26.11.34. G. K. Fairtlough, to No. 29 (F) Squadron, North Weald, 21.11.34. J. G. Glen, to Central Flying School, Wittering, 26.11.34. P. R. Robinson, to No. 820 (F.S.R.) Squadron, Gosport, 26.11.34.

Pilot Officers.—N. D. Gilbert-Smith, to No. 208 (Army Co-opera-

The following Pilot Officers are promoted to the rank of Flying Officer:—M. W. Kimpton (Sept. 18); J. Grierson (Oct. 28).

AUXILIARY AIR FORCE

General Duties Branch

No. 604 (COUNTY OF MIDDLESEX) (FIGHTING) SQUADRON.—F/O. A. E. Chatterton resigns his commission (Oct. 25).

AUXILIARY AIR FORCE RESERVE OF OFFICERS

General Duties Branch

A. E. Chatterton is granted a commission as Flying Officer in class A (Oct. 25).

tion) Squadron, Heliopolis, Egypt, 16.11.34. H. B. Hurley, to No. 23 (F) Squadron, Biggin Hill, 21.11.34. G. A. V. Kayvett, to No. 803 (F.F.) Squadron, 18.11.34.

Acting Pilot Officers.—R. G. Seys, to No. 14 (B) Squadron, Amman, Palestine, 1.11.34. J. M. Southwell, to No. 8 (B) Squadron, Aden, 7.11.34.

Stores Branch

Flight Lieutenants.—R. M. Thomas, to Headquarters, Coastal Area, Lee-on-the-Solent, 21.11.34. H. A. Wrigley, to Station Headquarters, Biggin Hill, 22.11.34.

Flying Officers.—P. Dennehy, to No. 4 Flying Training School, Abu Sueir, Egypt, 16.11.34. A. E. Haes, to Aeroplane and Armament Experimental Establishment, Martlesham Heath, 21.11.34.

Accountant Branch

Flying Officer.—G. E. Shirley, to No. 216 (B.T.) Squadron, Heliopolis, Egypt, 16.11.34.

Chaplains Branch

Rev. W. P. Hughes, to Headquarters, Palestine and Transjordan, 16.11.34. For duty as Chaplain (C. of E.) vice Rev. J. H. P. Still.

Dental Branch

Flight Lieutenant.—B. L. Harrington, to R.A.F. Depot, Uxbridge, 29.11.34.

LIQUID-COOLED ENGINES

(Continued from page 1307)

was that the danger of freezing would be practically eliminated.

Reverting to the subject of the compression-ignition engine, Capt. Forsyth stated that the Junkers "Jumo" IV had been type-tested and fuel consumptions reading as low as 0.35 lb. per b.h.p. had been obtained. This was lower than they could hope to reach in petrol engines. He foreshadowed a further development which might take place, namely, the coupling of two "Jumo" engines together into a common crank case, thereby making it possible for a 1,500 h.p. engine to be produced without increasing the height, and at the same time producing an engine which could be installed in a small space. The advantage of this type in a large machine would be that it would be possible for the pistons to be extracted without removing the engine from the aircraft.

Referring to the Deschamps two-stroke Diesel engine, Capt. Forsyth said that it had been hoped this would produce 12,000 b.h.p. at a weight of 2 lb. per h.p., but this was doubtful, as a great deal of stiffening-up would seem to be necessary before the engine was a success.

Commenting on the many attempts made to produce a satisfactory petrol two-stroke engine, Capt. Forsyth said he agreed with Mr. Fedden that the only prospect of producing a satisfactory two-stroke engine was to have it supercharged, using fuel injection. Regarding fuel injection, the lecturer said there was a limitation to the speed of the pumps, and as they would have to be operated at engine speed it might mean that double the number of pumps would have to be used for the two-stroke. The result would be complication. It was possible that the sleeve-valve engine might be made to work satisfactorily on the two-stroke principle. If the sleeve valve was satisfactory it might be possible to overcome the difficulties experienced in respect of the pump.

Various sleeve-valve liquid-cooled engines have been produced in this country. They had been mostly of the

single-sleeve type, and the results obtained had been most encouraging from an efficiency point of view. The weight-power ratio, however, had been high. The main objection to the sleeve-valve engine was the risk of breakage in the sleeve mechanism, which would have serious consequences and cause the engine to stop.

Gas turbines, steam engines, combined air and liquid-cooled engines and swash-plate engines were dealt with briefly by the lecturer, but he did not hold out any great hopes for any of these types.

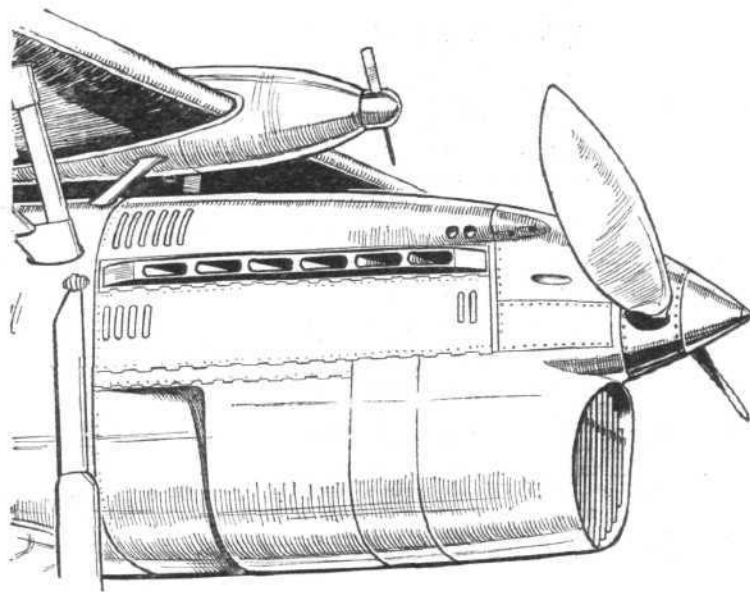
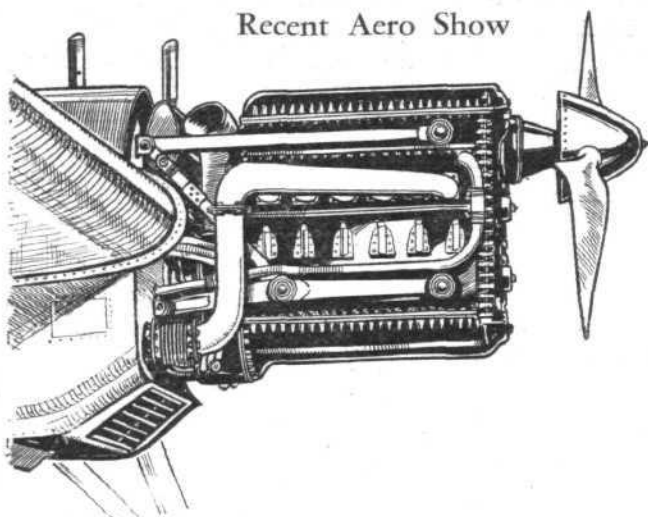
Capt. Forsyth thought the small air-cooled in-line engine would have a great field in low-powered commercial aircraft. Larger-size engines had been produced, such as the Isotta-Fraschini 60 deg. "V," but difficulty was experienced in cooling the rear cylinders.

After an examination of four types of engine starters, the R.A.E. Mark II gas starter, cartridge starting, inertia starters and electric, Capt. Forsyth came to the conclusion that the last-named was the most promising. The B.T.H. electric starter ran at high speed—6,000 r.p.m. It was coupled to an ordinary hand turning gear through gearing which enabled the aero engine to be turned at approximately 9 r.p.m. The current required for this electric motor was exceptionally low, and the all-up weight of the equipment increased the weight of the engine, in addition to the hand-turning gear, by approximately 7½ lb.

It was necessary to give careful attention to the cowling of liquid-cooled engines, as it was essential that the engines should be entirely cowled in. The cowling should be designed to give a clean contour, and the practice of adding pieces to the cowling should be discontinued. Sometimes it was necessary to provide additional cowling for the crank case, and the general practice was to cut a hole through the cowling. This should not be done. It had been found possible to provide crank case cooling by coupling the air intake to a double skin on the sump, thereby eliminating any necessity for cutting holes in the cowling.

PARISIAN ECHOES

Some Points of Interest at the
Recent Aero Show



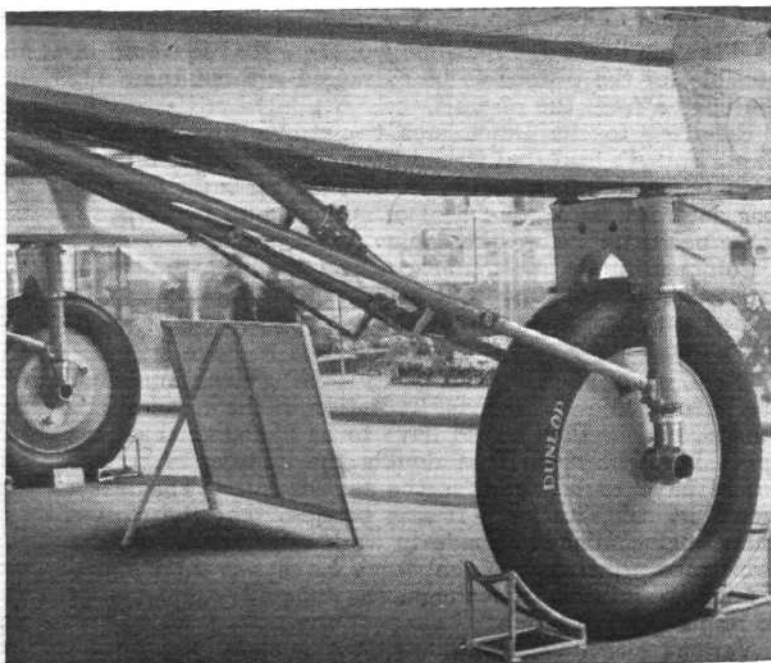
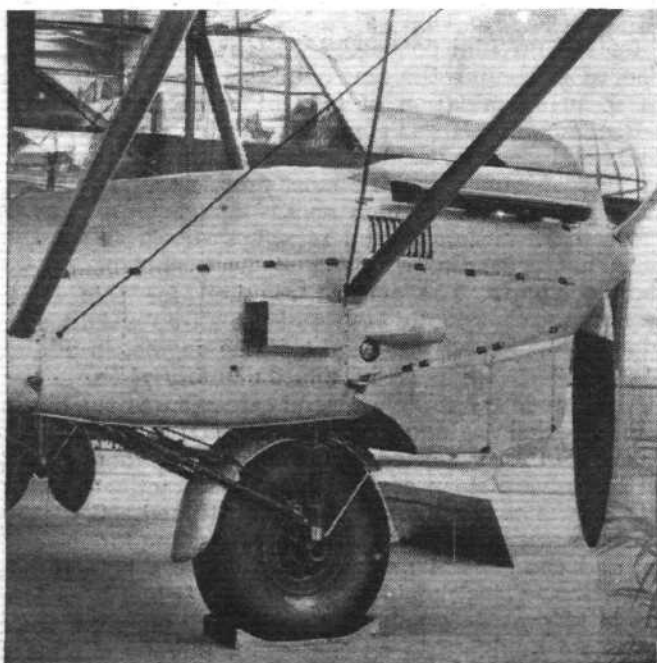
(Top left) How the "Jumo" 5 engine (vertically opposed compression-ignition two-stroke, with six cylinders and twelve pistons) is mounted in the Junkers Ju 52

(Top right) Arrangement of the air-driven electric generator in the Fiat CR 32 single-seater fighter.

(Left) The Fieseler four-seater built for the Challenge de Tourisme; large Fowler flaps are an interesting feature. (Flight Photo.)

(Bottom left) Engine nacelle and retractile undercarriage of the Potez 540 bomber. Note the nose gun turret. (Flight Photo.)

(Bottom right) Messier retractile undercarriage on the big Bloch 211. (Flight Photo.)



COMMERCIAL AVIATION

— AIRLINES — AIRPORTS —

CROYDON

Wedding Traffic : Sartorial Loads : Studying the Passenger : Connections with a Proposed New Service

NOW that the Royal wedding is over, it may be disclosed that quite a large number of wedding presents for the Duke and Duchess of Kent passed through the Airport of London. Imperial Airways carried several on the Empire routes, K.L.M. brought in one at least, and Air France had the honour of bringing Princess Marina's wedding dress from Paris, besides several other presents.

Various important passengers who flew across from the Continent for the wedding were received with more than ordinary police precautions. For the first time, when a Royal personage arrived recently, I saw an escorting car on the tarmac containing uniformed police, as well, of course, as the usual plain-clothes man from Scotland Yard. I am told that an idea exists that it is easier to enter or leave the country through an airport, but this is quite untrue of Croydon, where the authorities are remarkably vigilant and have their task simplified by the comparatively small number of persons who pass through at one time.

The Whiteshirt

Talking of parcels of clothing by air, a surprising number of suits of clothes are sent out by air from London, and not a few officers in "crack" Continental regiments have their uniforms made in Saville Row. Great numbers of dresses come into this country by air from Paris, mostly by Air France, and I recall a story that Sir Oswald Mosley's first black shirt came by air from Paris. Sir Oswald was at the airport the other day, travelling incognito, in a white shirt and unaccompanied.

It is understood that Capt. "Jimmy" Youell, the popular Imperial Airways commander, has now obtained his master pilot's certificate. He is the fifth Imperial pilot to do so.

It is very instructive to watch the arrival of two or three machines all coming in about the same time on a gusty day.

Certain aeroplanes deliver up their passengers pink and smiling, and all say they have enjoyed the trip. Other machines disgorge travellers not so pink and by no means smiling. It is a matter of the flying qualities of the aeroplane and, above all, perhaps, of the way they are flown and at what height. Several companies make a very great point of the way the pilots fly in bad weather, and explanations are required of pilots whose passengers suffer. It is considered better to have a late arrival due to flying high against a head wind than to make a swift passage flying low.

A New Line

The K.L.M. passenger list for last Sunday was a curious one. Out of fourteen passengers not one was for Holland, but all were for longer-distance connections: seven for Berlin, four for Malmö, two for Copenhagen, and one for Hamburg.

I hear that Provincial Airways contemplate a new line next summer, linking Hull with Nottingham, Leicester, Southampton, and the Isle of Wight. A machine from Croydon, and also from Plymouth and Land's End, will link up at Southampton with the line from and to Hull. Leicester to Plymouth will be about three hours by air as against about a day's journey by train.

There should be useful possibilities for speeding up mails by means of this service, and it would seem that the firm has proved its worth by maintaining the Croydon-West of England route through the winter. Plymouth is to have wireless next summer, I hear, and this should make very regular services possible.

The Hon. Mrs. Victor Bruce, who was so unlucky with her Autogiro flight to Cape Town, returned to Croydon in a Dragon piloted by Capt. Pugh on Tuesday of last week.

A. VIATOR.

Hillman's First Mail

The first air mail to be carried in this country without special fee, label, or inscription left Abridge Aerodrome, Essex, last Saturday shortly after the scheduled time, 10 a.m.

The flight was made by a D.H. "Dragon Six" of Hillman's Airways, Ltd., in charge of the company's chief pilot, Capt. W. Anderson, D.S.O. This was the first mail flight to be made by Hillman's Airways, but the machine already had an air-mail badge and the words "Royal Air Mail" painted on its fuselage, and an air mail pennant was flown from a short mast above the cabin until the take-off time.

A passenger occupied one seat; mail bags occupied most of the others. Forty-two of the forty-eight bags on board were destined for Belfast, four for Liverpool, and two for Glasgow. Letters posted in London too late for the night mail trains to these towns, but reaching the G.P.O. before 8 a.m., are now sent by Hillman's Airways.

Before the first machine left Abridge, the Duke of Abercorn, Governor of Northern Ireland, gave a letter to the pilot for delivery to Lord Craigavon, the Prime Minister. Mr. Edward Hillman handed over the log-book, while Sir Stephen Tallents, Public Relations Officer of the G.P.O., and Colonel Kemp, Controller of the London Postal Service, watched the proceedings on behalf of the Post Office.

Combating Ice Formation

Air France will be the first company in Europe to equip its passenger air liners with a de-froster or de-icer, as it is known in America. Everyone is aware of the danger arising from the formation of ice when passing through cloudy and humid zones. The ice, which forms first on the leading edges of the

wings and tail planes, spreads rapidly in the form of a crust which, on account of its weight and irregular surface, forms a very definite danger in winter flying.

The Goodrich Defroster, which has been adopted by the company, consists of a rubber covering running along the leading edge of the planes and containing a certain number of air chambers. Compressed air, delivered through a distributor, causes these chambers to pulsate, and the ice is broken before it has time to extend.

This equipment is used by many American lines.

Channel Islands Developments

Channel Island Airways, Ltd., is the title of a £100,000 company recently registered in the Channel Islands as the holding company for Jersey Airways, Ltd., and Guernsey Airways, Ltd. Whitehall Securities and Mr. Thurgood are those understood to be mainly interested in the company. This, presumably, foreshadows the linking up of Guernsey with the existing service between England and Jersey.

No Radio at Hedon

In a notice to airmen it is stated that the radio station at Hull (Hedon) is being transferred to Pulham.

London, Scottish and Provincial Airways had asked that this mobile unit might be temporarily installed at Sherburn aerodrome while the K.L.M. service is suspended, but evidently the Air Ministry is "not playing." Certainly, now that L.S.P.A. "Couriers" have wireless, the station would have been of immense value to them during their experimental winter service between Leeds, Heston and Paris.

Commercial Aviation**HESTON***Mails to Lahore : Another Kenya Trip : Flying the Wedding Pictures : Fog-Crawling in the Autogiro*

FOLLOWING the announcement by the Postmaster-General, Airwork, Ltd., is authorised by its associated company, Indian National Airways, to make a statement regarding air mails to India.

After next week a mail service will be operated by I.N.A. between Karachi and Lahore, which will connect with the arrival of the Imperial Airways aeroplane from England, and expedite the delivery of letters destined for the Punjab, North-West Frontier, Quetta, Baluchistan, and Kashmir at no extra charge beyond the flat rate of 6d. per half-ounce for all air-mail letters to India. The first Indian National Airways mail-plane will carry the mails which were posted in London last Saturday and will be transferred from Imperial Airways on arrival at Karachi.

Brigadier-General A. C. Lewin left Heston for Kenya on November 25 on one of his regular flights to East Africa. Piloting himself, he has several times made the journey of over 4,500 miles between London and Kenya, and this has been done with no especial object, excepting convenience and enjoyment. On the present flight he is accompanied by his wife, who is also a qualified pilot and will take a share in the flying. General Lewin took delivery of the aeroplane, a "Hawk Major," only a few days before starting. Before leaving Heston he stated that his intention was to take the Marseilles-Tunis route if weather conditions were good, or, otherwise, the land route down the Italian coast, via Rome and Catania.

The venerable sport of hawking in England is greatly assisted by the import of the live birds by aeroplane from Finland. According to Mr. Harold Swann, who learnt to fly at Heston in 1930, a good untrained bird costs around £4 10s., and half

the joy of hawking is, it seems, in the training of the birds.

At 2 p.m. on Thursday the wedding rush began to be felt at Heston. Six aeroplanes lined up on the tarmac, waiting to take the first pictures to the provinces, and an expectant crowd collected to watch them negotiate the fog. There was a general bandying about of weather reports and a wagging of heads at the Press pilot's risky job.

Three Birkett pilots took off in succession—and vanished, heard but not seen in the encircling mist. Then B.A.N.C.O.'s Avro "Commodore" went with its newly fitted Vickers-Armstrong landing lights. Others cancelled—some said wisely. The light was going, but Newcastle, Leeds, and Jersey stood a chance of getting their pictures the same evening.

The Earl of Essex, who took his pilot's licence with the Airwork School, has taken delivery of a new C.30 Autogiro and is one of the first private aeroplane owners to abandon the fixed wing in favour of the rotor. The delivery flight of this machine from Woodford to Heston provided an excellent demonstration of one of its greatest attributes—safety in bad visibility. Mr. R. L'Estrange Malone, of Henlys, left Woodford on Sunday, November 24, with fifty minutes' previous experience of flying this type of machine and an unfavourable weather report. Fog extended northwards from London for 100 miles. Leaving Manchester in fair visibility, Mr. Malone hit the fog at Burton-on-Trent, discovered a railway line, and flew along it at 35 to 40 miles an hour, below the level of occasional factory chimneys which his slow speed enabled him to see and avoid. After landing at Desford for petrol, he returned to the railway line, which he followed to within a few miles of Heston. He landed at Heston after 2 hr. 50 min. flying from Manchester.

CHRISTMAS MAILS*Posting for the First Service to Australia : The K.L.M. Flight to Netherlands Guiana*

AMONG all the normal air mail systems which can now be used with advantage at this time of the year, two are of special interest—the shortly-to-be-opened Australian service and the K.L.M. Christmas mail flight to Curaçao and Netherlands Guiana, of which details were given in *Flight* of November 8.

The first Australian air mail leaves on December 8, and the service will be available for correspondence to New Zealand and the Dutch East Indies. Letters posted before 10.45 a.m. on this date should be in Australia in good time for Christmas, and, conversely, those posted in Brisbane before December 10 will be due to reach London on December 24. Thereafter a machine will leave Brisbane on Wednesday and will reach London twelve days later.

The rate of postage in this service is 1s. 3d. for the first half-ounce and for every succeeding half-ounce, and 6d. for postcards, on mail destined for Australia, Fiji, New Caledonia, New Guinea, Papua, the Solomon Islands, and New Zealand. Mail to the Dutch East Indies, reached in nine days, is rated at 1s. and 6d. respectively for letters and postcards.

Correspondence can be handed over the counter at Imperial Airways, Ltd., Hudson's Place, Wilton Road, S.W.1 (Victoria), or posted in the Air Mail box at Charles Street, S.W.1, up to 11.15 a.m. on Saturday.

In December the K.L.M. will undertake a special mail flight from Amsterdam to Curaçao (6,500 miles), crossing the Atlantic between the Cape Verde Islands and Paramaribo (Netherlands Guiana). Mail will be accepted for Suriname (Netherlands Guiana) and Curaçao, and the envelope should be addressed to the General Postmanager at Willemstad, Curaçao, or to the General Postmanager at Paramaribo, Suriname.

For return purposes the sender's address should be put in the left-hand bottom corner of the envelope. The envelope must weigh less than 5 grams (0.176 oz.), and the cover should be put into a second one, addressed to K.L.M. at Hofweg 9, The Hague.

Letters must be in their possession before December 14. A money-order or cheque (not international post coupon) for Dutch guilders (1.06 per cover) should be sent at the same time. Charges for return postages will be paid by the K.L.M.

As far as the other Imperial air routes are concerned, the latest times and dates of posting are 10.45 a.m. on December 22 for Egypt, Palestine and Baghdad, the same time on December 19 for Beirut, and on December 15 for Basra, Bahrein, Bushire, India (barring Ceylon), Bangkok and Singapore, and a week later for Colombo and Hong-Kong. Letters for Sudan, Kenya, Uganda, Tanganyika and Zanzibar must be posted at 10.45 a.m. on December 19, and for Rhodesia and South Africa on December 12.

Letters to the Argentine and Brazil, if sent by Air France and superscribed "via France," or sent by Deutsche Luft Hansa and superscribed "By German Air Mail," should be posted at 8 p.m. on December 14. Bolivian (La Paz) and Chilean mail can be sent with reasonable safety on the same date by either route.

This company is also making a special high-speed flight to Batavia with the mails this Christmas. A Douglas D.C.2 will leave Schipol on December 20, and will be in Batavia before Christmas Day. An equally fast return trip will be made a day or two later.

D.H.89 for Spanish Company

Last week Mr. Loring, a senior pilot of the Spanish company, Lineas Aereas Postales Españolas, took delivery of a D.H. "Rapide" model "Dragon" (D.H.89).

Twenty-three of these machines have, incidentally, been sold this year—four of them to Mr. Edward Hillman, who was indirectly responsible for the production of the standard "Dragon," which has done so much to make unsubsidised air line operation a commercial proposition.

The D.H.89 cruises at 138 m.p.h. with a range of 580 miles, and carrying a payload of some 2,220 lb. In these circumstances the service ceiling is 21,300ft. with both engines and 5,000ft. with one engine.

New Vacuum Appointment

On taking over his new duties as Aviation Director of the Vacuum Oil Company, Mr. E. C. Gordon England has relinquished his work for the automotive section of that company.

CIVIL AVIATION DEVELOPMENTS

Deputation from the Parliamentary Air Committee Sees the Prime Minister : More Money for Civil Flying : Changes in the Organisation Suggested

LAST week the Prime Minister received a deputation from the Parliamentary Air Committee, who desired to place before him a number of well-defined suggestions for improvements in the organisation of civil flying. With the Prime Minister were Lord Londonderry, Secretary of State for Air, and Sir Philip Sassoon, Under Secretary of State for Air. The deputation from the Parliamentary Air Committee included Rear-Admiral Sir Murray Sueter, Mr. O. E. Simmonds, Mr. Whiteside, Captain F. Guest, and Commander Oliver Locker-Lampson. The following are the suggestions made by the deputation:—

(A) ADMINISTRATION

(1) Appoint a second Under Secretary of State to deal exclusively with civil aviation. (This is a fair compromise between the majority and minority reports of the Gorell Committee.)

(2) The Director of Civil Aviation to be a member of the Air Council. (This is a unanimous recommendation of the Gorell Committee.)

(B) IMPERIAL COMMUNICATIONS

(1) Immediate provision be made for improved ground organisation (emergency landing grounds, wireless beacons, night flying equipment, etc.)

(2) Speed up the services on Imperial air routes by (a) increased air speeds and range, (b) night flying.

(3) Increase frequency of services.

(4) No new obligation to Imperial Airways, Ltd., should be undertaken by the Government which would preclude its financial encouragement of other British aircraft operating companies.

(5) Undertake energetic investigation of trans-oceanic air services.

(C) INTERNAL FLYING

(1) Develop civil aerodromes for both day and night flying, and, in particular, make them more accessible from the towns they serve.

(2) Develop frequent passenger and mail services throughout British Isles.

(3) Develop night air mail services in this country and to the Continent.

(D) COSTS OF FLYING

(1) Reduce cost of flying by removing petrol tax, de-rating aerodromes, and giving more generous treatment to private owners and flying clubs.

(E) AIR SURVEY

(1) Develop air survey of the British Isles and the Empire.

(F) METEOROLOGY

(1) Weather reports to be issued more frequently with greater detail, and to be more readily available.

Comment on these developments is made on p. 1293.

K.L.M.'s New Terminal

The Royal Dutch Air Lines have to thank the Metropolitan Traffic Commissioners for "moving them on" and, at the same time, for allowing a period in which the company could discover some really good new London Terminal.

On Monday last Mr. Plesman, the Managing Director of K.L.M., officially opened the premises at Horseferry House, opposite Lambeth Bridge, and it was felt generally that "everything was for the best." Modern, bright and beautifully equipped, the new terminal is, in addition, only a thirty minutes' run from Croydon. There is a lounge, a bar and a complete restaurant down below; both the terminal decorations—by the Dutch artist, Mr. Luyt—and the furnishings have an aerial *motif* with a K.L.M. colour scheme of red, blue and silver.

Air France, incidentally, who have also been obliged to find new quarters, are temporarily accommodated at Horseferry House.

The MacRobertson-Miller Service

A schedule of three days for the journey of 2,400 miles from Perth, Western Australia, to Katherine, in the Northern Territory, which will bring Perth much nearer to London, is anticipated by Capt. H. C. Miller for the Australian North-West air mail service next year.

Capt. Miller, one of the principals of the MacRobertson-Miller Aviation Company which recently secured a five-year contract for the North-West service under the revised system of Australian air routes, will inspect the route and the various landing grounds and equipment available in the organisation of the present operators, West Australian Airways, Ltd. Daily stages of 800 miles will be flown in next year's North-West service, and it is proposed to employ "Dragons" or similar types.

Flat Rate for All India

The Postmaster General announces that the extra fee of 2d. for letters intended for air transmission in India beyond Karachi by the Karachi Bombay Madras air service has been abolished. Letters may now be sent by air to all parts of India to which an air service operates, and to Ceylon (by air to Madras) for an inclusive charge of 6d. per half ounce.

New R.Ae.S. Lecture Venues

The following R.Ae.S. lectures have been arranged for the second half of the present session. All the lectures will be held in the lecture theatre of the Institution of Electrical Engineers, Savoy Place, Victoria Embankment, W.C.2, at 6.30 p.m., except the joint lecture on March 5, which will be held at the Royal Geographical Society, Kensington Gore, S.W.7, at 7.30 p.m.

Jan. 7.—"Imperial Air Routes," by Mr. F. Snowden Gamble.

Feb. 8.—"Ice Formation in Carburettors," by Mr. W. C. Clothier, M.Sc.

Feb. 22.—"Research in the R.A.E. Tank," by Mr. L. P. Combes, B.Sc., A.C.G.I.

Mar. 1.—"Fuels for Aircraft Engines," by Mr. E. L. Bass.

Mar. 5.—"Problems of Cold Presswork," by Dr. H. Gough, F.R.S., and Dr. Desch, F.R.S. (Joint Meeting with the Inst. of Automobile Engineers and other bodies.)

Mar. 15.—"New Developments in the Autogiro," by Senor Juan de la Cierva, F.R.Ae.S.

Mar. 29.—"Piloting Commercial Aircraft," by Sqdn. Ldr. H. G. Brackley, D.S.O., D.S.C., F.R.G.S.

April 12.—"Commercial Aircraft," by Capt. G. de Havilland, C.B.E., F.R.Ae.S.

May.—Wilbur Wright Lecture.

Demonstrating Airspeeds in India

Lord Ronaldshay, the chairman and managing director of R. K. Dundas, Ltd., is at present in India with an Airspeed "Courier" on a demonstration tour. The machine is being piloted by Mr. G. Tyson.

Diary of Forthcoming Events

Club Secretaries and others are invited to send particulars of important fixtures for inclusion in this list.

Dec. 6. "Flaps and Other Devices." R.Ae.S. Lecture by R. P. Alston.

Dec. 6. "Recent Progress of the Autogiro." R.Ae.S. Lecture by Senor Juan de la Cierva. POSTPONED to Second half of Session.

Dec. 7. Martlesham Heath Annual Dinner.

Dec. 13. "Recent Research in Metallurgy." R.Ae.S. Lecture by Dr. W. H. Hatfield.

Dec. 15. Masonic Country & Flying Club, Christmas Dinner and Dance, "Julian Hill," Byfleet Rd., Weybridge.

Dec. 15. York County Aviation Club, Christmas Dinner Party the Club House.

Dec. 18. Herts and Essex Aeroplane Club Annual Dinner and Dance, Park Lane Hotel, Piccadilly, London.

Dec. 18. Old Etonian Flying Club, First Annual Dinner, Savoy Hotel, London.

Dec. 19. Banquet and Dance in honour of Mr. C. W. A. Scott and Mr. T. Campbell Black, Grosvenor House.

Dec. 29. Association Football, R.A.F. v. Oxford University, at Ilford.

AIR POST STAMPS

By DOUGLAS B. ARMSTRONG

(Editor of "Stamp Collecting," etc.)

Air Stamps Passing

THE prophecy made by early pioneers of air post collecting that one day all first-class mail matter would be carried by air without distinction is rapidly approaching fulfilment. Already the British Post Office has shown the way by dispensing with distinctive markings upon inland letters intended for aerial transmission, which are now sent by the most expeditious route, whether it be aeroplane or train. When this practice becomes general, as in course of time it undoubtedly will, air stamps and air mail labels will no longer be required, except possibly in the case of express delivery by air, and even the commonest varieties of pioneer air post covers will take on an added interest and enhanced value as mementoes of the harnessing of the "air" to the service of the post.

First U.K. Aerial Postcards

Meanwhile the collecting of pioneer air post stamps and covers should gain fresh impetus from the coming change. Correspondents are continually enquiring as to the value to collectors of the very interesting series of souvenir cards and envelopes associated with the first United Kingdom aerial post experimentally carried out between London and Windsor in connection with the Coronation festivities just over four and twenty years ago. Generally speaking, their worth is small, for two reasons. First, because of the large numbers carried, totalling 136,000 between September 9 and 16, 1911, and, secondly, for the reason that almost everyone who received them was tempted to preserve them for their historical interest. Of the total number "flown," more than one hundred thousand cards and letters were postmarked on the first day, September 9, so that by far the greater number of those commonly offered bear that date. The average market price for those printed in red-brown, yellow-brown and olive green is about 7s. 6d. to 10s., but envelopes in bright red or emerald green are slightly more elusive, fetching anything up to a pound or so. The real rarities are the "privilege" letters and cards expressly printed in Royal purple, and these frequently realise as much as £5-£6 in auction.

As there was but one flight from Windsor to London, compared with twelve in the opposite direction, it follows that cards bearing the inscription: "From Windsor to London," or even the London-Windsor cards posted at Windsor, are more to be desired, particularly the purple varieties.

New Issues

Except for a very effective set of commemoratives in connection with the Italian flight from Rome to Mogadiscio (Italian Somaliland) on the occasion of the official visit of King Victor Emmanuel to that colony, the past month has brought few notable additions to the air stamp collection. The Italian stamps are six in number, and their predominant feature a head-and-shoulders portrait of the King on a plain ground printed in photogravure after the design of Professor Rondini, their values and colours being 1 lira violet, 2 lire blue, 4 l. red-brown, 5 l. green, 8 l. rose-red and 10 l. brown.

Four high values have been included in the permanent set of Chilean air mail stamps for exterior use in impressionist designs of aeroplanes displayed against backgrounds of the sun or starlit sky, namely, 20 pesos sepia, 30 pesos sepia, 40 pesos purple and 50 pesos claret.

From the Dominican Republic (West Indies) comes a new 10 centavos air mail stamp in an adapted design showing a view of the recently opened "Trujillo" Bridge with an aeroplane flying overhead.

The existing air post stamps of the Saar Territory have been uniformly overprinted "Volksabstimmung 1935" under



NEW ISSUES: Left, one of the six stamps issued by Italy to commemorate the flight from Rome to Mogadiscio. Right, a 5 fr. value issued for the French Oceanic Establishments.

authority of the Plebiscite Commission in temporary control.

A picturesque air mail stamp of 5 francs denomination showing the arrival of an aeroplane at a palm-fringed Pacific island, printed in green by the heliogravure process, after the design of M. Douy, engraved by A. Mignon, emanates from the French Oceanic Establishments.

The Air Mail Society

The new association of air mail enthusiasts was successfully inaugurated on November 8, when a committee of organisation was formed consisting of Messrs. Armstrong, Dalwick, Greenwood, T. E. Field and R. Harker (hon. secretary), Stonen, Bullsmoor Lane, Waltham Cross, Herts.

Among the proposed activities of the organisation are the setting up of an aero-philatelic expert committee, a general information bureau, exchange packet, lectures on air mail collecting, etc., and competitive displays. Membership is open to both amateur and professional air mail collectors of all nationalities.

De Havilland Achievements

Speaking in reply to the toast, "The Directors and Management," admirably proposed by Mr. A. J. Davey at the annual dinner of the De Havilland Aircraft Company, held last Saturday, Mr. F. T. Hearle, general manager of the Company, gave some interesting facts about the progress made during the past twelve months. First he referred to the production of the D.H.86 in four months, and the D.H. "Comet" in time to take part in and win the Australia Race. Both achievements, he said, were indicative of the wonderful loyalty and enthusiasm of all the employees, inspired by the example of Capt. de Havilland himself, to whom they all owed so much.

Discussing the work of the past year, Mr. Hearle said they had sold, apart from many smaller aircraft, twenty D.H.86's and delivered eight of them; sold twenty-five D.H.89's and delivered eleven; sold 177 "Gipsy Six" engines and delivered eighty-nine; sold 1,044 "Gipsy Major" engines and delivered 930. In November last year the firm employed 1,231 persons, and this year that number had risen to 1,970.

Production of Hamilton C.P. Airscrews

De Havillands are setting aside one of their workshops at Stag Lane for the manufacture of controllable-pitch airscrews under the Hamilton Standard patents. Mr. R. Hutchinson will be in charge of production, Mr. J. V. Holman of sales, and Mr. F. H. Thomas, who is being lent from the research department of the Hamilton Standard Company for a year, in charge of design. Airscrews suitable for all sizes of engines, including the "Gipsy Six," will, it is hoped, be available next year.

Further details of the new developments which *Flight* mentioned last week are now to hand. The fitting described will, when finally produced, be such that it can be attached to any standard two-pitch airscrew and will then, by automatic variation of the pitch over a wide range, give constant engine revolutions, thus ensuring that the engine is working at its best whatever the conditions of flight.

NEW COMPANIES

GEOFFREY DAVIES, LTD. Capital, £2,000 in £1 shares. Objects: To carry on the business of garage and aerodrome proprietors, proprietors and letters on hire of and piers for hire with aircraft and vehicles of all kinds, etc. The first directors are: Frederick C. Davies (permanent governing director and chairman), Mrs. Rose H. Davies and Geoffrey H. Davies, all of 44, Park Place, Cardiff.

BRITISH AND OVERSEAS AIRCRAFT, LTD. Capital £5,000 in £1 shares. Objects: To carry on the business of manufacturers, designers and constructors of and dealers in aircraft and shipping of all kinds, boats, yachts, automobiles, motor cars and cycles, etc. The subscribers (each with one share) are: Conyers Surtees, solicitor, and H. C. Ellis, solicitor, both of 18, Austin Friars, E.C. The first directors are: Thomas C. Worth (managing director) and others to be appointed by the subscribers. Solicitors: Slaughter and May, 18, Austin Friars, E.C.2.

AERONAUTICAL PATENT SPECIFICATIONS

Abbreviations: Cyl. = cylinder; i.c. = internal combustion; m. = motors. (The numbers in parentheses are those under which the Specification will be printed and abridged, etc.)

APPLIED FOR IN 1933

Published November 29th, 1934.

- 2638. BENDIX AVIATION CORPORATION. Variable-pitch propellers. (418,973.)
- 11991. COATS, A. G., RUTHERFORD, W. V. D'A., and HAFNER, R. Helicopters and rotating-wing aircraft. (418,674.)
- 13057. VICKERS (AVIATION) LTD., (Kurth, F. J.). Apparatus for extinguishing flame in the gases flowing from the exhausts of aircraft engines. (418,998.)
- 23645. COATS, A.G., and HAFNER, R. Rotating-wing aircraft (418,698.)

Published December 6th, 1934.

- 9392. THOMSON, A. A. B. AND COOKE, G. H. Mechanism for carrying or releasing loads from aircraft. (419,061.)

APPLIED FOR IN 1934.

Published, December 6th, 1934.

- 3886. JUNKERS, H. Hollow rivets and rivets joint. (419,342.)